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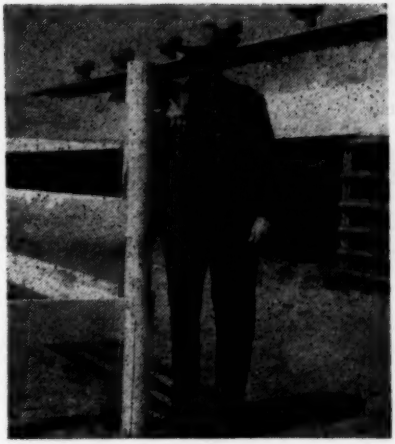

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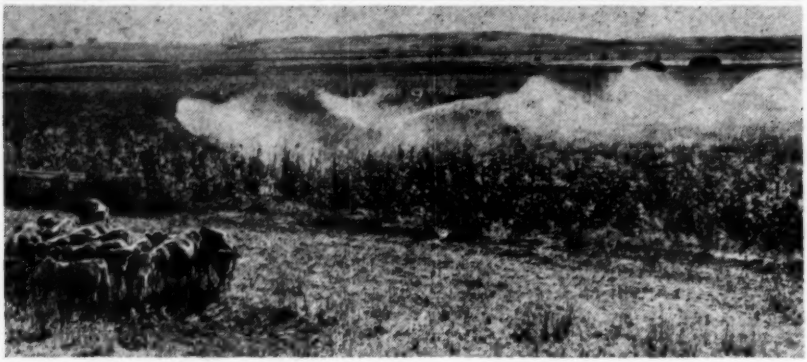

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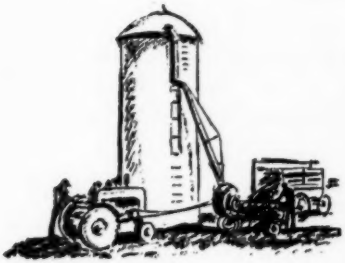
The Farmer's Digest

Volume 21 June-July 1957 Number 2

You Can't Beat Corn for Silage



Corn gives you big tonnage per acre, is easy to make, and produces a lot of milk and meat . . .

Condensed from Capper's Farmer

A. R. Norman

CORN is still king of the silage crops. On good land you can't beat it.

How can you beat a crop that chops 30 tons to the acre? In corn silage you get grain as well as roughage. Corn makes silage of almost foolproof quality. And it is about as palatable as anything a cow ever ate.

Thirty tons sound pretty big? Well it can be done even in the northern states.

Harley Chapman up in Ionia county, Michigan proved it when he plastered 2 acres with manure, then used 800 pounds of high analysis fertilizer to the acre—mostly plowed down—and planted thick.

His 2 acres filled a 10- by 35-foot silo. By the standard silo capacity table, that comes to 30 tons of corn silage to the acre.

Go south a couple of hundred miles and 30-ton yields pop up quite often.

Around Hershey, Pennsylvania, where summer distribution of rainfall is good, some growers have been able to show close to 25 tons to the acre as an average of several years. Top growers in New Jersey get similar yields.

Speaking for the area around Carrollton, Missouri, one hybrid

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grower says, "A good yield should be over 30 tons of fresh chopped corn to the acre at 70 per cent moisture."

So far, we have been talking about corn grown without irrigation. Corn growing is still new on irrigated lands in California and Arizona. But it may catch on fast. Growers who have tried corn for silage in competition with other high value crops find they can get yields up to 45 tons or more.

Roy R. Mathews in California had a field of irrigated corn last year that cut 46 tons to the acre. He left part of the field to ripen and picked it. It shelled out 216 bushels to the acre.

But yield is not the whole story with ensilage corn. Quality is just as important. Maybe more so. And quality, I believe any panel of experts would agree, is measured by the amount of grain in the silage.

Corn is naturally so well suited to preserving itself as silage that we can wait until the crop is fully matured before harvesting. That is, we can wait until the grain is dented. After that no further nutrients will be added if the crop is left standing.

The time to harvest is when the grain is at about 50 per cent moisture and the stalks and leaves around 70 to 75 per cent moisture. This is the definition given by C. M. Harrison, forage crops specialist at Michigan State University.

It pinpoints the advice of the experts I consulted. Harrison says that corn yielding 10 tons of green weight will add about 1,000 pounds of dry matter as the ears mature from 70 per cent moisture to 50 per cent.

In farmer language, Felix Witt, seedsman and beef feeder of Lenawee county, Michigan, puts it this way: "Wait until corn is very well dented, or as near maturity as you can get it and still have the foliage green enough to keep well.

"We don't intend to shorten the growing season or cut the yield by filling silo before we get the maximum growth for that season."

Some dairymen cut corn for the silo while still in the milk stage in the belief that too much hard corn goes thru cows undigested. "Don't worry about it," says dairy nutritionist C. F. Huffman of Michigan State. He cites a study which showed the undigested grain amounted to only 6 per cent.

"Even if it looks as if half the grain is in the gutter, pigs would starve behind dairy cows," Huffman remarked. "The extra nutrients in corn left to mature more than offset the loss in undigested grain."

This doesn't mean you should let corn stand until the stalks and

leaves are dead, or frost has dried up the sap. If corn gets too dry, add water at the silo. But it is typical of hybrid corn that the leaves and stalks are still green when the ears have matured. The point is — harvest corn for silage *just as soon as* the ears are mature.

Give this mature corn a fine cut. Fine chopping makes silage pack firmly in the silo so you don't get spots of mold. And you get more in. Juices flow from all the cut ends to aid fermentation.

Purdue University dairymen say that fall and winter freshening pays. In 30 DeKalb County DHIA herds, a comparison between the three high cows and the three low cows in the same herds shows that 67 per cent of the 90 best cows freshened during the fall and winter mouths. Some dairymen claim an advantage of 50 pounds of butterfat per cow due to fall and winter calving.

Well-fed cows don't care for long pieces of stalk butt. However, a test at Iowa State College on corn lacerated with a flail-type chopper showed that fermentation was good and the silage packed well. This type of silage contains some long pieces, but the stalks are crushed and battered.

What should we plant, then, to get best yields of top-quality corn silage?

Experts say to pick a good grain hybrid that matures about a week or 10 days later than the hybrids usually recommended for grain production in your area.

Some hybrid corn companies offer special ensilage hybrids that not only produce a big tonnage with lots of grain, but have the added advantage of sweeter stalks and, in some cases, core leaves.

You can stretch the green weight of crop by planting late-maturing hybrids, but you lose in yield of nutrients. Charles F. Rogers, silage specialist at the Ohio Experiment Station, says you get the maximum total digestible nutrients per acre by growing corn for silage that takes 10 days longer to mature than the most dependable grain hybrids for your area.

Even the rather dry, very grainy corn silage made by Felix Witt yields from 13 to 15 tons to the acre and has gone as high as 18 tons in a favorable season.

Yields in this range are excellent for Michigan where rainfall is typically short right when the crop needs it most.

Corn harvested as silage returns about one-third more nutrients than when picked for grain. So it is only logical to raise silage corn on the best piece of ground

on the farm and to fertilize it to the limit. It is an extra high value crop that returns more for every dollar you spend to fertilize and control weeds.

Thicker planting is standard practice for ensilage corn. But how thick is ideal?

Some dairymen with sizable herds on limited acreage have been trying to stretch the crop year by putting in silage corn after an early-cut meadow crop.

Roy Emrick, Michigan State University nutritionist, believes corn for silage will return more nutrients than any other crop that could follow an early cutting of grass in the same season. He believes it would beat Sudangrass.

Naturally, a late-planted crop calls for an earlier maturing hybrid to produce the highest yield of nutrients. A good application of fertilizer will help to boost the yield and to mature the crop in season.

Beef feeders seem pretty well agreed on the merits of corn silage, either for conditioning cattle or for fattening. G. A. Branaman of Michigan State says you can expect about 2 pounds of gain a day with a ration of good corn silage plus mineral and protein supplement.

Corn silage is also one of the most useful feeds for milk production. Huffman has shown that the grain in corn silage is just as valuable in the dairy ration as grain from the crib. He advises cutting a pound of corn from the concentrate ration for every 10 pounds of silage fed.

Corn silage is a high energy feed. It stimulates milk production when fed with hay. It supplies some protein, but only about 2 per cent. You need a protein supplement to balance heavy corn-silage feeding—16 to 18 per cent in the grain ration, according to Michigan State nutritionists.

"Farming up and down the hill
Puts less money in the till!"

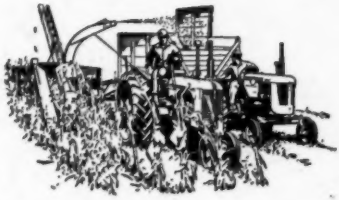
Huffman warns that we should feed a cow at least 10 to 15 pounds of hay a day with any silage. Cows fed entirely on silages seldom eat enough to get all the dry matter they need for top production.

If you feed 15 to 20 pounds of good legume hay with around 50 pounds of corn silage, you won't need more than 12 to 14 per cent protein in your grain.

With grass silage so much in the limelight in recent years, some dairymen may be overlooking a chance to do more business on the home acres.

On good corn land, corn as silage can produce a pound of nutrients about as cheaply as the best meadow crops. Yields can be a lot higher. That means more feed for a larger herd, and a bigger milk check.

What's Best Way to Harvest Corn?



A facts and figures comparison of five ways to "get in" your corn . .

Condensed from
an Iowa State College Bulletin

Floyd L. Herum, Kenneth K. Barnes

FARMERS have several choices in selecting corn harvesting methods. The most common method, of course, is to pick and husk with a mechanical picker and put the ears in a crib for natural drying.

But there may be better ways. Farm drying units, for example, make it possible to pick early and dry artificially. Farmers who feed their own corn on their own farms often find that ensiling ear corn or shelled corn is desirable.

Field shelling equipment now is available in a number of forms. Pull-type picker-shellers, mounted or self-propelled picker-shellers and several forms of trailer shellers are on the market. These are good machines and may offer you an efficient approach to your corn harvesting problem. Under Iowa conditions, however, field-shelled corn usually is too wet for safe storage. It must either be artificially dried or be ensiled.

Comparing Methods . . .

To furnish information on various corn harvesting methods, we decided to compare the over-all costs of several corn harvesting methods. To do this, we included all operations involved in processing corn from stalk to marketable shelled corn or usable ensiled corn. These operations include picking, hauling, elevating, drying, storage and shelling.

Each of these operations involves depreciation, interest, maintenance and operating costs on the equipment or buildings used. And different methods involve different amounts of field losses; so these too were evaluated and compared for the various methods.

We selected five specific harvesting methods for our comparisons; they were:

1. The conventional method using a mechanical picker-husker. The kernel moisture was considered to be 20 per cent, and the

Reprinted from an Iowa State College Bulletin, published by
The Agricultural Experiment Station, Ames, Iowa

corn was stored in a crib until either fed or shelled.

2. Picking with the picker-husker at 26 per cent moisture and drying artificially in a crib with heated air.

3. Picking with a corn picker at 30 per cent moisture, processing the corn with a stationary ensilage cutter and ensiling.

4. Using a picker-sheller at a kernel moisture of 25 per cent and drying with heated air.

5. Using the picker-sheller at 26 per cent moisture and ensiling the shelled corn.

Harvesting at high moisture content is one way of reducing field losses. Such losses result from: (1) loose ear loss—ears dropped before the picker gets in the field; (2) picker ear loss—ears knocked off by the picker and not recovered; (3) picker-sheller loss—corn shelled off the ears by the snapping rolls and crushed ears which pass through the rolls; and (4) sheller loss—corn which passes through the sheller in the picker-sheller.

Here are the losses as we found them in picker-sheller tests. These patterns are typical of corn picking losses.

Loose ear loss increases steadily as corn dries. At 30% moisture, loss was approximately 2%, at 10% moisture nearly 5%. Picker ear loss showed the same increase but ranged from 3% at 30% to about 6% at 10% moisture.

Picker-shelled losses decrease as the kernel moisture drops from 30 to 25 per cent. This is because, at 30-per cent kernel moisture, the cob is easily crushed and passes through the snapping rolls. Also, the shank of the ear is tough; this results in the kernels being shelled from the ear rather than the ear being snapped from the stalk. As the corn dried to 25-per cent kernel moisture, the cob becomes tougher and the shank more easily broken. Further drying results in increased ease of shelling and consequent increase in losses of shelled corn at the snapping rolls.

New Yorkers are getting sophisticated. On April 1 of this year (April Fool's Day) only 2,038 telephone calls were made to the Bronx Zoo asking for Mr. Lyon, Mr. Fox, Mr. Wolf or Mr. Baer. In 1955, pranksters promoted 5,738 calls.

Thus, picker-shelled loss started at about 7% at 30% moisture, decreased to 4% at 26%, then increased to 12% in dry 10% moisture corn.

Sheller losses are low throughout the moisture range decreasing gradually as the moisture content decreases to practically zero.

The curve for total field losses shows that minimum losses occur

between 30 and 24-per cent moisture. But is the saving in corn resulting from picking at high moisture enough to pay for the cost of drying? This is one of the things we wanted to know.

What We Found . . .

In figuring our costs, we added the value of field losses to the cost of harvesting. Thus, the cost figures we show are much higher than you'd have to pay out-of-pocket to get corn harvested, stored and dried. The comparative costs are the important things here.

Of the three methods using conventional corn pickers, the ear corn silage method (No. 3) is consistently less expensive. Costs per acre ranged from $29 on 25 acres of corn to about $20 on the 100 acre operation. However, the ear corn silage must be used as a livestock feed to maintain the value of the crop; that is, the silage can't be marketed. Any gain coming from reduced harvesting expenses demands complete and economical utilization of the ear corn silage.

The conventional method of harvest (No. 1) is less expensive than the pick-crib-dry-shell method (No. 2) because the savings in field losses seldom equal the additional drying costs. Costs for method 1 ranged from about $35 per acre on 25 acres to $25 on 100 acres. Costs for method 2 varied from $40 on 25 acres to $27.50 on 100 acres.

Using a picker-sheller at kernel moisture of 25 per cent and drying with heated air (method 4) showed the high cost on a 25 acre base of $42.50 per acre. On the 100-acre basis, costs dropped to $25 per acre. For method 5 which used a picker-sheller at 26 per cent moisture and ensiled the shelled corn, costs ranged from about $33 on 25 acres to only $22 on the 100 acre operation.

When harvested acreage is above 125 acres per year, the picker-shell-dry-bin method is less expensive than the methods requiring cribbing of ear corn. The decrease in storage costs makes up a great part of this saving.

Remember that our calculations are necessarily based on some assumptions. Field losses are considered to be complete losses—making up from $8 to $10 per acre of the total cost. This isn't always true; some recovery may be made by turning livestock into the stalk fields.

For this reason, total harvesting costs usually are somewhat less than indicated—depending on the degree and efficiency of field loss recovery. If we assume, however, that the recovery from all methods is reasonably similar, the relative differences in harvesting costs are still valid.

In our figures, we allowed no value for safety from crop depre-

ciation because of early frost and wet falls. The four methods which include ensiling or artificial drying eliminate corn spoilage such as resulted in the 1951 harvest season.

Corn losses due to high moisture occasionally make the total cost of the conventional method many times as great as the other methods. This analysis includes no additional charge to the conventional method for the weather hazard.

In Brief . . .

Remember that in a bad corn harvesting year, early picking and artificial drying may save a large portion of the value of the crop. And, when such a situation develops in the fall, it may be too late to change harvesting methods because of necessary changes in buildings and equipment.

To be prepared for a bad year, you need to be set up for early harvesting and artificial drying on a routine basis. Our figures show that, at a reasonably high level of corn production, you can break even on early picking and drying year in and year out—and be prepared for the bad year when early harvesting will save as much as half the value of the crop.

Seed Corn Buying Tips

1. *Buy adapted hybrids.* Spoiled corn is wasted feed, food, and labor. Try early hybrids for late planting.
2. *Look at the maturity label on the bag.* Your state law has put it there for your protection.
3. *Buy two or more hybrids.* Seasons vary and hybrids respond differently.
4. *Try new hybrids.* Improvements are constantly being made. Try new hybrids on a limited acreage the first year.
5. *Buy from a reliable source.* Local dealers and reliable firms want satisfied customers.
6. *Be sure the hybrid is backed by research and field tests.* Good hybrids are developed through years of breeding and testing.
7. *High prices and high pressure don't prove a hybrid.* Be sure to check performance and maturity trial results, if your state conducts them.
8. *Choose hybrids carefully.* Your yield is limited by the yield potential of the hybrid you plant.
9. *Check the grade.* A bushel of medium grade seed will plant more acres than a bushel of large grade seed.

—University of Minnesota

Easier Interseeding with Corn

Legumes can be seeded between sixty-inch corn rows to boost per acre yields and cut erosion . . .

Condensed from The Farmer

INTERSEEDING of alfalfa in corn is now possible with machinery available on most farms.

Interseeding of corn — spacing corn rows 60 or 80 inches apart, then seeding a legume between rows in mid-summer — has been practiced successfully on Upper Midwest farms where summer moisture is plentiful for three or four years. But it has usually required special inter-row seeding equipment.

Last spring University of Wisconsin experimenters, working on sandy soils at the Spooner station, produced 50-bushel corn and a good stand of alfalfa using a regular corn planter, ten-foot grain drill, sectional roller and a weed sprayer.

In addition to the good fall stand of alfalfa, they also retained the two major benefits of interseeding—(1) reduced soil erosion, possible by keeping ground covered and well protected during late summer and fall and (2) greater production per acre, brought about by eliminating oats, the normal legume nurse crop, from the rotation.

"This makes the third year at Spooner when 60-inch (interseeded) corn rows have yielded 50 bushels of grain per acre," says A. M. Strommen, station superintendent, of his 1956 experiment. "We produced a total of 2,800 pounds of grain per acre in contrast to a 35-bushel yield from oats, which would be only 1,120 pounds per acre. It would take 80 to 90 bushels of oats to equal a 50-bushel corn crop in total weight." Yields of first year alfalfa hay, grown between 60-inch corn rows, have averaged about four tons.

Controls Erosion

Speaking on the values of erosion control from interseeding, Orville E. Hays, who has carried on interseeding experiments for

Reprinted by permission from The Farmer, St. Paul 2, Minnesota

several years as project supervisor of the LaCrosse, Wis., station, says: "Interseeding can be expected to reduce soil losses to less than half the loss from a corn-grain-hay rotation. In studies at LaCrosse more than half the erosion from a corn-grain-hay rotation has occurred in the grain year. By interseeding, grain is eliminated from the rotation. Land is open only from time of plowing for corn until the new seeding becomes established."

First, the field, which had been in corn the year before, was spring plowed and worked in the ordinary way. Corn was planted in rows 60 inches apart, using an ordinary planter. Two hundred pounds of 5-20-20 fertilizer was applied per acre at planting. Corn was planted at a 12,000 to 14,000 stalks-per-acre rate (one kernel every seven to nine inches) on the sandy loam soil—a necessary increase to produce the same yield from rows 60 inches apart as from more-normal 40-inch rows.

Immediately after the planting field was rolled to compact the soil. This was done to get weeds started growing sooner, necessary to help get a better weed kill later.

When corn was in the two-leaf stage it was sprayed with one gallon of di-nitro (Premerge) per acre to kill weeds.

Nothing more was done until the corn was 18 inches tall, at which time weeds were again beginning to show. Then a ten-foot grain drill, from which the two disks directly over each of two corn rows had been removed, was put into the field. The drill was set a little deeper than normal—to loosen soil and destroy weeds—and pulled over the field once. It was used on a warm day.

Two days later 150 pounds of ammonium nitrate per acre was side-dressed on the corn. The cultivator was set "very shallow," so as not to damage corn roots but still leave a loose, topsoil mulch for both corn and the new seeding.

The next day the drill with the disks removed was used to seed alfalfa at 12 pounds per acre. Three hundred pounds of 0-20-20 per acre was also applied by the drill at the same time.

A sectional roller (Brillion) was used immediately after the seeding, both to firm soil around the legume seed, and incidentally, to push down any rocks which might give trouble in the fall when stalks were cut.

Nothing more was done until the corn was four feet tall. Then it was sprayed for weeds, using a 20-foot boom and drop nozzles. "Chemical control of weeds is essential," says Supt. Strommen, "to reduce competition to alfalfa seedlings."

The weedicide which gave best

control at Spooner last year was an application of two pounds per acre of Dalapon and one pound per acre of 2-4DB. That plot produced 59 bushels of corn (figured at 15.5% moisture) per acre, plus a "normal" alfalfa stand. "Alfalfa seedlings were affected slightly by the weedicide," says Supt. Strommen, "and some plants showed some yellow leaves, but by fall the alfalfa stand appeared normal."

"The interseeding method tried at Spooner last year can be used on sandy soils with success," says Supt. Strommen, although "since 1956 was the first time we used it, we hesitate to recommend it too strongly until we have tried it another time."

The '56 method required less cultivation. Also, the special, inter-row seeder, which had been used the two years before, was not needed. This eliminated build up of a small dirt ridge in the corn row, which had formed in prior years and had given trouble during hay harvest.

In experiments legumes have not been able to compete for light, fertilizer or moisture when seeded between 40-inch corn rows. When put into 80-inch-wide corn rows the legume did well enough, but corn yield was reduced 15% to 20% because not enough corn plants per acre could be crowded into the wide-spaced rows.

The direction in which corn rows are planted may make a difference on legume stand. Studies at Iowa State College indicate that legumes have less chance when corn rows are planted east and west than they do when they are planted north and south.

Old Folks Leaving the Farm

The farm population as a whole has been gradually aging, with young folks leaving for the cities and older ones staying on the farm. Perhaps the social security program will help restore the balance.

As the older folks leave the farm, their land will, of course, be rented or bought by neighboring farmers and added to their existing farms. Production will not be decreased; in fact, in many cases it will be increased. However, farmers who are able to pick up additional land in this way will have more economic units.

For the country as a whole, this is exactly the adjustment agriculture needs and anything which speeds it up is a good thing for farmers and for the rest of us.

—From the Des Moines Register

How to Match Your CORN PLANTING RATE to Productivity of Soil

If your rate of planting just matches ability of land to produce corn, ears will weigh one-half pound, on the average. If ears average less than one-half pound, this indicates over-planting; if ears average more than one-half pound, this indicates under-planting.

To apply the "one-half pound-ear-yardstick," the grower must provide:

8,500 ears	11,475 ears	15,300 ears
to get	to get	to get
60 bushels	90 bushels	120 bushels

For every 100 kernels planted, you may expect to harvest 85 ears (plus or minus); loss or death or weakness or mishap will eliminate the other 15 prospects. Therefore you normally will need to plant 15 per cent MORE kernels than the number of ears wanted. For instance:

9,000 kernels	13,500 kernels	18,000 kernels
to get	to get	to get
60 bushels	90 bushels	120 bushels

Here are some EXAMPLES OF PLANTER SETTINGS to deliver the above results:

If drilling in 40-inch rows, space kernels:

17½ inches apart	11½ inches apart	8½ inches apart
to get	to get	to get
60 bushels	90 bushels	120 bushels

If hilling in 40 x 40-inch hills, drop alternately:

2 and 3 kernels	3 and 4 kernels	4 and 5 kernels
to get	to get	to get
60 bushels	90 bushels	120 bushels

John Slipher, Extension Conservationist, The Ohio State University, Columbus, Ohio

The Double-Barreled Attack on Weeds

Here's how to gang up on weeds in corn with chemicals and cultivation . . .

Condensed from The Furrow

E. P. Sylwester

THE best way to produce high-yielding corn is to go all out against weeds. If cultural practices alone aren't enough, then use up-to-date chemical sprays. In other words, fight weeds with both barrels.

Don't Overlook a Crop Rotation

First of all, remember that a good crop rotation is the foundation of a good weed-control program. Certain weeds such as foxtail, lambsquarter, pigweed, buttonweed, barnyard grass, etc., build up in clean cultivated crops but can be brought under control when land is in legumes or pasture. Repeated clipping or grazing prevents weed seed production. Likewise, such weeds as yarrow, dandelion, ragweed, downy bromegrass, buckhorn, daisy fleabane, build up in pastures but are easily destroyed in clean cultivated crops.

Fall or early spring plowing helps control weeds. In fall plowing, the main consideration is to keep weeds which follow from going to seed. If a killing frost doesn't come, disk or harrow the field to prevent these late weeds from producing seed.

Start spring plowing as soon as the soil is friable. If a good job of plowing is done, the field can be left rough, or it can be disked lightly to make a smooth, firm seedbed that will encourage weed seedlings to germinate immediately. A second disking will kill this first "wave" of weeds.

Each time you work a field, try to time the operation to destroy a wave of weed seedlings. Remember, every wave killed out in fall or early spring is just one less "crop" to fight later.

Always disk and harrow lightly, fast and shallow. Few annual weeds germinate at depths greater than 1½ to 2 inches. Proper shallow disking or harrowing firms the seedbed, conserves moisture, and encourages weed seeds in the upper soil layers to germinate. Repeated, shallow diskings or harrowings on warm dry days have tremendous weed-killing power. An extra harrowing or two ahead of planting is often the cheapest operation in an ef-

Reprinted by permission from The Furrow, Moline, Illinois

fective weed-control program, since it enables the corn to get a head start. Of course, the number of harrowings should be balanced against the severity of the weeds—harrow enough, no more. Excessive harrowings increase the costs and may compact the soil.

Use Good Seed

Plant good hybrid seed corn, adapted to your specific area and treated with proper insecticides and fungicides to insure a uniform stand at an early planting date. Plant for capacity stand. By all means, avoid empty spaces or skips in the row. Such spaces invite weeds. And remember, each day you delay planting after seedbed preparation is just 24 hours more in favor of weeds.

After planting but before the corn is up, it'll pay to harrow again. Every well-timed harrowing is death to another wave of weed seedlings. Harrowing is most effective when weeds are still in the "white stage," when young and tender without well-established root systems. If a few days elapse after the "before planting harrowing," more weed seeds will have germinated and more seedlings will be destroyed.

After corn has been planted and the area harrowed, you should make a choice between more harrowing and rotary hoeing or pre-emergent spraying with a chemical herbicide. Under normal conditions, a pre-emergent spray should give corn a real head start over its weed competition. However, if conditions are too dry after the chemical has been applied, its effectiveness will be reduced.

Pre-Emergent Sprays Are Effective

Such materials as Randox at 5 pounds per acre (for grassy weeds) or 2, 4-D at 1 to 1½ pounds per acre (for both grassy and broad-leaved weeds) or premerge at 2½ to 3 gallons per acre (for both broadleaved and grassy weeds) have value in pre-emergent spraying (all made as blanket applications). If weed seedlings are not killed outright, they are stunted so that cultivation is more effective.

If a field is extremely weedy—and in most years too wet for good cultivating, harrowing, or rotary hoeing to control weeds—a pre-emergent spray may be just your answer. Such conditions justify trying pre-emergent spray with any of the chemicals mentioned. Spray a small area first to see what it will do under your own conditions. Secure additional information from your county extension agent, as to exact dosages and best materials to use.

When applying a pre-emergent spray, have the soil surface as clod-free as possible. Blanket spraying over the entire area is preferable since it may eliminate at least one cultivation. However, over-the-row or band-spray-

ing will reduce the amount of chemical used, and thus lower its cost. This will, however, leave weedy middles to be controlled by cultivating. Aim to eliminate at least one cultivation by spraying. This helps recover original costs of the chemical.

Harrows and Hoes for Fast Control

Pre-emergent spraying as a blanket application usually costs more than a single harrowing or hoeing. On land not too severely infested with annual weeds, either of these cultural practices can control weeds effectively and at lower cost.

A Seattle man is getting $1 a day in a court award because a power pole cross-arm extends over his property line. He complained that it marred the view from his home.

If you harrow when the corn is small or rotary hoe after it attains some size, do the operations on warm dry days, preferably in the afternoon when the corn is more flexible and tolerant to such operations. For greatest effectiveness, operate the harrow or rotary hoe at speeds of 10 to 15 miles per hour. After corn is 4 to 5 inches high, it is best to start cultivating.

Post-Emergent Sprays

As soon as corn shows in the row and until it is 3 to 5 inches high, it can be sprayed for control of many broadleaved weeds —buttonweed, smartweed, sunflower, wild buckwheat, mustard, morning-glory, etc. Lower dosages are used in early post-emergent spraying than are used in pre-emergent spraying. One-half pound of the "amine" form or one-quarter pound of the "ester" of 2,4-D per acre is sufficient. In case of a 4-pound per gallon concentrate of 2,4-D this means one pint of the "amine" or one-half pint of the "ester" per acre, either one in as much water as your sprayer delivers per acre. You don't need drop extensions at this time. Simply raise the boom and cover the entire area with a light mist.

You should know exactly how much solution your sprayer applies per acre. If you don't know, calibrate the sprayer carefully as to amount of water used, speed, and pressure. This is essential for successful spraying.

Cultivating Comes Next

Naturally the better the early weed-control program, the easier cultivating will be. Cultivations should be fast and shallow, and done on bright warm days if possible. Shallow, rapid cultivations kill weed seedlings quickly and reduce chances of injury to corn roots. Fast cultivating also saves time and throws more soil to rows or hills, so you don't have

to cultivate as close to the corn. Cultivations should aim to "lay corn by" weed-free.

Lay-By Spray as Last Resort

If good controls have been used, there's normally no need for a "lay-by" spray. Certainly you should estimate the best time to use chemical sprays for greatest effectiveness. This may be a pre-emergent spray or a spray when corn first comes through the soil. The lay-by spray, however, is an "ace in the hole" if other methods have been inadequate.

Lay-by spray is the last chance with regular spraying equipment. It is imperative to use not more than one-half pound of the "amine" or one-fourth pound of the "ester" of 2,4-D per acre, at this time, and it is necessary to use drop extensions on the sprayer boom. Highly fertilized corn, growing fast with plenty of moisture, may suffer some damage from lay-by spraying. Corn may become brittle and be broken off by high winds. So—use lay-by spraying only as a rescue operation.

Aerial or High Clearance Spray

Late spraying, either immediately before silking and tasseling or just after pollination is completed, is seldom necessary except where a good many broadleaved weeds have germinated after laying by. When the corn has completed its growing upwards, spraying with high-clearance equipment or an airplane can effectively reduce competition from weeds. Late spraying also prevents many weeds from setting seed, thus reducing the weed problem the following year. This is especially true of such late flowering weeds as cocklebur and sunflowers.

It is necessary to use higher dosages of 2,4-D during late spray because the weeds are older and tougher. Use at least three-fourths to one pound of "amine" or one-half to three-fourths pound of the "ester" of 2,4-D per acre. If high clearance equipment is used, set the drop extension nozzles to spray the tallest growing weeds. With airplane application, avoid spray drift to adjacent sensitive crops.

The average United States farmer today is 50 years old, compared with 48 in 1940, census figures show.

Weed losses in corn vary the country over, according to season, soil fertility, climatic conditions, etc., but commonly run from 5 to 15 bushels per acre. Where operators are careful stewards of their land and follow a good weed-control program, losses are substantially reduced. The wise farmer will try out on a small basis the latest weed-control information available through his local Agricultural Extension Service.

You Can Buy Swine Free of Disease

What to look for and how to go about selecting breeding stock . . .

Condensed from
Successful Farming

John B. Herrick, D.V.M.,
Iowa State College

"I WANT to buy a boar free from disease" is the statement heard by many swine producers. And it's a statement being heard more every year.

Recently, a large hog producer went out of the hog business because of disease. When he went to restock his herd he had a great deal of trouble finding disease-free breeding stock.

More and more hogmen are becoming conscious of this problem and breeders are attempting to develop programs to offer buyers hogs from disease-free herds.

Indiana now has a program by which a breeder can develop a certified disease-free herd. Iowa has instituted the plan and several other states are considering similar plans. Recognition is given to a herd of hogs which have been thoroughly checked by more than one veterinarian. This makes the owner eligible to receive a certificate issued by the State Swine Association.

Suppose you want a boar or a group of gilts from a disease-free herd. What are you going to look for? Check the list below and see how thorough you are in selecting healthy breeding stock.

Hog Cholera:

The main item for years in disease control has been hog cholera immunization and it is still a must. A number of states are now attempting to eradicate hog cholera entirely.

Erysipelas:

Still the most unpredictable disease the swine producer battles. More purebred breeders have their herds under their veterinarian's supervision for this disease. Immunization is definitely part of a control program.

Brucellosis:

This one is a must. A disease that can no longer be tolerated. Many breeders are developing certified brucellosis-free herds. Look for these and have little faith in the single test—it is the herd test that counts. Don't buy a clean animal from an infected

Reprinted by permission from Successful Farming, Des Moines, Iowa

herd—they are dangerous.

Leptospirosis:

This disease is causing headaches in the swine industry. It acts like brucellosis to some degree. The blood test should be correlated with clinical symptoms of the disease in a herd before a herd can be called infected.

In England, a chicken killed a mother of five children. The pet white cockerel bit Mrs. Bowden on the leg and severed an artery. She bled to death within an hour.

Rhinitis:

One of the cries is "Where can I buy rhinitis-free hogs?" It is doubtful if all hogs have rhinitis—and it is doubtful if we will ever know the exact degree of infection in our herds. Apparently rhinitis is an "opportunist" disease. That is, it does its greatest damage when other factors are not up to par. Poor management, nutrition, and other diseases will bring rhinitis "out in the open" so to speak, if hogs are harboring it. How can you tell if hogs have rhinitis? You can't always—an individual may look perfectly O.K. and still be a carrier—this is where herd history is involved. A history of sneezing, distorted noses in a few, nose bleeds, and lesions in the nostrils of pigs posted or slaughtered will give you the lead.

Scours or Enteritis:

There are many different types of scours ranging from those due to poor management and deficiencies to those that are infectious and can be spread by breeding stock. Herd history is your best bet to spot possible trouble.

Virus Pneumonia:

This is an apparently new disease to the swine belt. It can be spread by breeding stock, yet it is extremely difficult to tell without clinical examination of the herd and postmortem checks on pigs or slaughtered hogs.

Lice or Mange:

These is no excuse for external parasites on hogs, yet occasionally breeding swine are sold with invisible evidence of external parasites.

The procurement of disease-free hogs for herd replacement is not easy. The Certified Health Herd has pitfalls to overcome—but the producer of breeding stock should not discard the idea because it is not completely foolproof.

Consider these factors when buying breeding stock or keeping animals disease-free:

1. The number one spreader of disease is infected breeding stock.

2. What is the health status of your own herd—are they harboring disease? It is foolish to place healthy hogs with an infected herd.

3. Dogs, cows, and other animals may bring disease to your farm.

4. Raw meat or trimmings from your own farm are dangerous. Feed sterilized garbage only.

5. Trucks, sacks, and shoes that have been in infected lots may bring you unwanted trouble.

6. Water from contaminated lots may seed down your premises with disease.

7. Buy or make some signs in bold print simply stating "Keep out—Disease Control." Swine producers should maintain a quarantine area for at least 30 days before adding new stock to the herd.

Swine production is becoming highly specialized. Rate of gain and feed utilization is all important. Hogs harboring disease are not efficient. Swine producers should sit down with their veterinarians and map out a program that fits their herd and their farm. Meanwhile, get behind your swine organizations and livestock committees and aid and promote programs that will provide healthy herds.

1957 Fly Season Recommendations

"Artificial fog" is going to keep more cows more comfortable this summer, according to E. H. Fisher, University of Wisconsin insect control specialist. He figures that flies and mosquitoes can cause as much as a 20 per cent milk production loss.

Dairymen are using "barn fogging" just before milking to curb this loss, he says. With barn fogging, you don't need a residual spray on walls and ceilings. Fogging also gives cows a protective coat to ward off flies and mosquitoes after returning to pasture.

For fogging, a farmer uses a four-nozzle unit, suspended in the center of the barn to put out a layer of fog just below the lowest beams. The nozzle unit is connected to a compressor. Spray for the fogger contains one per cent piperonyl butoxide plus a tenth of a per cent pyrethrins, says Fisher.

This spray can also be applied to animals with either a hand plunger, or a knapsack sprayer. The treadle sprayer requires a mixture five to ten times as strong.

In other fly control news, Fisher reports that methoxychlor and lindane are not now approved for fly or lice control on milking dairy cattle. These sprays can be used on the barn when the cattle are not in. However, Fisher feels that a residual spray like Diazinon, Dipterex, or malathion will do a better job on barn walls and ceilings.

—University of Wisconsin

Law on the Farm

By Norm Krausz

Seventh of a series on farm law by Norm Krauz of the University of Illinois Extension Service. Articles are prepared with Illinois conditions in mind. Laws in your state may differ.

Compensation to Tenants for Disturbance

Compensation for disturbance is a payment made by the landlord to the tenant when the tenant is forced to quit the farm *through no fault of his own.* For example, a landlord may wish to place his son on the farm, or return to farming himself for social security.

The payment is based on the theory that in a well-settled country where farms are not readily available, owners of land have an increased responsibility with regard to the tenure of the people who live on and operate their land. A notice to quit, even if given six months or more before the term ends, no longer affords adequate protection for the tenant with a large investment in machinery, equipment and animals.

Damages payable should be based on several factors, among them length of tenure, general availability of farms, cost of moving and loss to tenant through inability to find a farm that will fit his present equipment, machinery and livestock. The English law sets one year's rent as a minimum disturbance payment. This probably would be too high under present conditions in Illinois and the corn belt.

If the tenant is forced to move and another farm is available, the payment could be only the cost of moving. If another farm is not available, an additional payment based on the factors mentioned above could be set out as a fixed amount in the lease. This would provide considerable incentive for the landlord to help the tenant find a new farm.

A law requiring a disturbance payment would not be entirely without precedent in Illinois—the guarantee of "quiet enjoyment" contained in a deed is similar in principle and purpose, except that it applies to the grantor-grantee relationship.

They Shoot for X-tra Corn Yields

The Eickhoff's extra yields mean extra profits . . .

Condensed from Massey-Harris Farm Profit

Lee Schwantz

HEAVY stands of corn backed up with plenty of fertilizer have meant an average of 77 extra bushels of corn per acre over the last four years for the Eickhoffs of Fillmore Co., Minn. Emil Eickhoff and sons Donald and Virgil have the figures to prove that it pays off big when you match stand and fertilizer to soil and moisture.

The Eickhoffs are star performers in Minnesota's X-tra yield contest. Judged on the basis of increase in yield over an unfertilized check plot, Eickhoffs have placed in the top three in all four years the contest has been running. Their increase in yield has been from 47 to 99 bu. per acre. Figured with $1.40 corn, the extra profit, after paying for the fertilizer, has averaged just over $75 an acre.

Last year the Eickhoffs' test field made 160 bu. per acre. Boosted along with 890 lbs. of fertilizer and good rainfall, it outyielded an unfertilized check plot by 99 bu. Profit above fertilizer cost was $93.60 per acre.

Forty-five other Minnesota farmers made above 140 bushels and over half of the 269 entries in the contest topped 120 bushels.

Looking over the records of the contest, Dr. Charles Simkins of the University of Minnesota observes, "The greatest single lesson we've learned is that it takes high plant populations to get the big yields."

Yields averaged 67 bu. when stands were around 10,000 stalks per acre; when stands were boosted to 16,000 plants, yields jumped 20 bu. to 87 bu. Spending an extra 50c for more seed *produced 20 bu. more corn.*

Donald Eickhoff sets 18 to 19,-

	FERTILIZER USED		YIELD RESULTS			PROFIT PER ACRE
Year	Lbs. per acre	Cost	Fertilized	Check	Difference	$1.40 corn
1953	160	$18.55	126.05 bu.	72.4 bu.	47.6 bu.	$66.64
1954	300	$33.00	147.8 bu.	58.5 bu.	89.3 bu.	$92.02
1955	300	$36.00	112.1 bu.	50.1 bu.	62.0 bu.	$50.80
1956	890	$45.00	160.1 bu.	61.1 bu.	99.0 bu.	$93.60

Reprinted by permission from Massey-Harris Farm Profit, 1025 Empire Bldg., Milwaukee, Wis.

000 stalks per acre as his goal when he climbs on the planter. He drills 1 kernel every 8 inches to reach that population. Actually, he did even better last year with a final stand count of just over 20,000 plants.

Donald doesn't believe in deep planting. He drops kernels less than 1-inch deep. Sometimes he can even see kernels on the surface. Shallow planting brings plants up quicker and helps kick them off to a fast start.

HOW TO PLANT FOR BIG HARVESTS

Yield Goal	Planter	Kernels	Plants
Bu. per acre	Setting for 40 rows	Planted per acre	Per Acre at harvest
100-125	3 every 22"	21,500	17,500
80-100	2 every 18"	17,500	14,000
60-80	2 every 21"	15,000	12,500
40-60	3 every 40"	11,500	10,000

Once the corn is up, Donald makes sure it isn't pruned with the cultivator. "We never cultivate any more than is necessary," he says. "And we always use shallow sweeps close to the row." Last year some of the corn was cultivated only once; some of it was weeded three times.

The Eickhoff land is in a section of the Corn Belt that gets good rainfall almost every year. It also is contoured to save moisture and is heavily fertilized. That means heavy stands are relatively safe. You'll want to match your stand to your own fertility and moisture situation.

E. R. Duncan, Iowa State agronomist, says there's not much point in going above 10,000 kernels if you average 40 to 50 bu. corn and do not plan to boost your use of fertilizer. You can get that with 3 kernels per hill checked in 40-inch rows.

If your farm is in the 60-bushel range, 14,000 stalks offer a better chance for increased yields. Above this level, you'll want to power-check or drill since the 4 stalks per hill you need for 16,000 stand is too many for good yields.

There's not much point in going above 20,000 stalks even on the best land. In Illinois tests, no hybrid has done better at 25,000 stalks than at 18 to 20,000.

These figures are stalks per acre at harvest time. You must plant more kernels to get that kind of stand. Most agronomists say you have to plant an extra 15%. The chart with this article shows typical planting rates for various stands.

Your planter manual or seed corn tag will tell you what plates and settings you need to get the desired number of kernels in the ground. But be sure to check the calibration. Even a small error can be dangerous when you are up in the 16 to 18,000 range. A poor adjustment might throw you above 20,000 plants and that could cause trouble if weather turns dry.

Robert White, Michigan ag en-

gineer declares, "Shifting the average spacing between kernels only a quarter of an inch changes plant population 500 stalks per acre." White also has studied the effect of speed and concludes that 3 m.p.h. is about as fast as a planter should go. "You lose 800 plants per acre for each 1 m.p.h. above that speed," he reports.

Provide enough plant food for your big stand. The Eickhoffs follow soil test results—and that's good practice for any farmer. Their usual plan is to put on 250 lbs. of 5-20-20 plus 100 lbs of anhydrous ammonia. They stepped this up last year on their X-tra yield corn using 890 lbs. as follows: 200 lbs. of 0-0-60 and 250 lbs. of 5-20-20 broadcast before plowing; 200 lbs. of 5-20-20 in the planter; 240 lbs. anhydrous ammonia on June 15.

The Eickhoffs farm 480 acres near Fountain, Minn. They grow about 175 acres of corn, some of it on land that cost only $27 per acre 10 years ago. Their liming and fertilization program has built up this land to the 100-bu. level. Now it can support the kind of thick stands that mean high-profit corn yields, year after year.

Test Results on Shortfed Charbray Steers

Fourteen Charbray steer calves posted an average daily gain of 2.13 pounds during an 84-day fattening period and showed an average 210-day weaning weight of 525 pounds, report Texas A & M Animal Husbandmen O. D. Butler and J. K. Riggs.

The calves were full-fed a fattening ration composed of cottonseed meal, ground sorghum grain, sorghum silage, and alfalfa hay. Steamed bonemeal and salt were available free choice and creep feeding was practiced irregularly during part of the suckling period.

Butler says the calves showed an overnight shrink of 3.4 per cent and dressed 60.3 per cent. Carcasses averaged Low Good grade, he adds, and percentage of round was about 27.61 per cent or two per cent higher than other slaughtered cattle studied. Yield of loin, rib, and round was 51.41 per cent.

Loin steaks and chuck roasts from one Average Good and three Low Good grade carcasses were rated from "good" to "very good" for tenderness and general desirability by a panel of families. Scorecard for the "eating desirability" test included adjectives of excellent, very good, good, medium, poor, very poor, and unacceptable.

—Texas A & M College

Save $7. Per Ton on Feed Processing

Plan your system to eliminate unnecessary handling . . .

Condensed from Electricity On The Farm

Lowell D. Overmyer

FOR YEARS the common method of processing feed on the farm was to load the grain on a wagon, haul it to a shed where the feed mill was located and shovel the load into the mill.

Since it took so much time to handle the ingredients, the only way to save time was to use a lot of power and cut down grinding time. This theory on power application did not lend itself to using electric motors as a source of power. Likewise, hand-fed mills powered by 5 or 7½ hp single phase motors were too time consuming.

Clarence J. Lavy, an Ohio farmer, who with his sons feed 1200 to 1500 head of hogs a year, wanted to make farm feed processing practical and completely mechanized. At the same time he wanted to do it with electric power. He examined a completely automatic system, then adapted equipment to semi-automatic operation and his own situation. One 5 hp and three ¼ hp motors turn out feed at the rate of 2500 lbs. per hour, all by pushing a button.

Shelled corn and either oats or barley are stored in two overhead hopper bottom bins. Protein concentrate is handled in 100 lb. bags, but a 4" auger, 12 ft. long is used to put the supplement into a bin that feeds a metering device. Three meters, one for each of the three ingredients are used to proportion out the material. These meters work on a volume basis. A 5-inch canvas belt carries the grain under an adjustable gate that does the measuring. After metering, a 4-inch horizontal auger blends the mixture and moves it to the mill for further processing.

Hammer Mill is Heart of System

The actual grinding is done by a hammer mill powered by a 5 hp motor. The capacity of this system is controlled by adjusting the rate of feed to run the motor at its rated amperage input as indicated by an ammeter.

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Family Farm 1957 Style

If you think the family farm can't compete, read about the Renks . . .

Condensed from Farm Quarterly

Fred Knoop

THE EXPERTS speculate "What is going to happen to the family farm in the coming years when automation gets into full swing in barns and fields?" They ask, "How can a family put up the money to buy a big, productive farm, then spend that much more for equipment?"

The answers to these questions, viewed with alarm by the experts, have been laid on the line by members of the William F. Renk family of Sun Prairie, Wisconsin. This 92-year-old farm is getting huskier every year. Ideas that seem to sprout as fast as corn in June have turned the 1118 acres into an operation that passed a $600,000 gross in the fiscal year ending in June, 1956.

This family of professional farmers have no other irons in the fire. They have made a study of their land, their costs, their talents and the markets near them. Their farming plan for 1957 is based on an income distribution of, roughly, 58 per cent hybrid corn, small grain and grass seed production and sales to other farmers in the upper tier of the Middle States, 38 per cent beef and hogs, and 4 per cent a dairy operation.

Renk farming, in a couple of words, is "flexible farming." Almost daily contacts with research men at the University of Wisconsin, with Chicago and Madison buyers, with the feed suppliers, and a constant probing for more economical methods of feeding and production keep the operation extremely flexible and able to change, buy, or sell as the situation demands.

To see what gives this farm its vigor, we have to look in on the members of the family. William F. Renk is 82, yet he makes a daily round of the farm and he greets every guest who comes on business, or just to look. His father, Nicholas Renk, started

Reprinted by permission from Farm Quarterly, 22 East 12th Street, Cincinnati, Ohio

putting the big farm together in 1864.

When Nicholas died in 1888, he had a farm of 297 acres. There was a fine herd of Shorthorn cattle and several flocks of Shropshire sheep. His sons, William and Henry, were already farming it along with a sister, Catherine.

In 1898, when William graduated with honors from the short course in Agriculture at the University of Wisconsin, things began to happen. With his brother, Henry, he bought their first imported purebred Shropshire sheep to add to the grade flock. In that year they established a Milking Shorthorn herd, and erected the first upright stone silo in the country. The silo was a good investment; it cost $138. Today it still carries 145 tons for the Angus breeding herd in the farm lot.

In 1901, William Renk married a girl from a nearby farm, Caroline Derr. Four children were born in the busy farming years that followed: Walter, Robert, Wilbur, and a daughter, Marion.

In 1906 the Renks imported 20 Hampshire sheep from England and established the breeding line that was tops at the state fairs and International in Chicago. In 1907 and 1909, William Renk made trips to England to select the top animals from Hampshire flocks there. In 1910, Henry Renk's health was such that he offered to sell out his part of the farm. William Renk bought him out, and the "& Sons" was added to the farm name.

The sheep and grain operations continued to grow. A feed lot for handling Western sheep was built in nearby Columbus, Wisconsin, and as many as 18,000 were fattened in a year. Purebred sheep were sold all over the country and twice a year an auction ring was set up in the machine shed on the Renk farm. Buyers outbid each other to make Renk sheep the top-priced animals for a number of years. William Renk was honored in 1938 as one of the nation's great breeders and his picture was hung in the Saddle and Sirloin Club in Chicago.

Been to Florida lately? In 1881, saw manufacturer Hamilton Disston bought four million acres of Kissimmee-Okeechobee-Everglades land for one million dollars. That's 25 cents an acre.

But times and markets changed. The sheep operation was closed out at its high point; the Shropshires were dispersed in 1948. In 1952, the Suffolks and Hampshires were dispersed at the highest average prices ever paid in an auction sale for these breeds. The Renks have never felt that the pride of accomplishment should freeze the farm into any

rigid program. Besides, farming operations had changed; the market no longer was absorbing lambs and mutton at high prices.

The important reason for going out of the sheep business was the revolution in farming that swept through the Midwest, starting in 1932. In that year, in Iowa County, down in southwestern Wisconsin, there were 10 acres of hybrid seed corn grown. The next year the Renks were in the hybrid seed corn business. The ears of corn from their first 10-acre field were hung on strings in the barn, then carefully shelled by hand, graded, checked for germination, and packed. This first hybrid seed corn sold for $15 and $16 a bushel.

Seed corn was not a new crop for the Renks. They had retailed and wholesaled Wisconsin Golden Glow for years, but hybrid corn was something new. Farmers came from miles around to see it growing. And when it was harvested, the skeptics had to eat their stories. Here by a simple substitution of one bushel of golden seed for another, yield of 60 to 70 bushels was upped to 100 to 125 bushels. It took no more work; no more cultivating; just more ears to pick and sell or feed. It was as simple as that!

Renk Hybrids grew by leaps and bounds, and with them the amount of roughage left over as waste or roughage feed. That was the prime reason the big herds of feeder cattle were brought onto the farm. They could do a better job with roughage than the sheep could.

Another big change came to the Renk operation soon after the hybrids arrived. Walter and Wilbur graduated from the University of Wisconsin Agricultural College. Robert had attended for a year. Farming as a business didn't look too good in the 30's, not to three young men with ability and ambition.

Says Walter Renk, "Things were tough in those days. Wilbur, Robert, and I called a meeting to talk over the whole idea of planning ahead. From that meeting came the idea to set up a farm family corporation. As far as we knew, it was the first family farm in the country to be incorporated. The incorporation is the backbone of this farm. From the time we put it into force, we all knew where we stood.

"All three of us stayed on the farm. Wilbur took charge of the hybrid seed corn production and sales. Robert, who is the mechanical one, took over our growing machinery line-up. I took on the management, along with Dad. We have elected officers. We work for a salary. We have stock and each owns shares.

"When you draw up incorporation papers for a farm, you put

everything down in black and white and avoid the possibility of family quarrels at some later date.

"So what happens when one of our children wants to go to work for the farm? Take my son, John. He graduated from Wisconsin Agricultural School, spent two years in the army, then went back and took his Master's Degree. He is interested in hogs. We sat down and talked over having him as our hog manager. He had new ideas based on the work he had done with some of the top men at the University. We handle around 1500 hogs a year that we buy as feeder pigs. John thought we should raise some. So we hired him on a salary. He's done a good job, fattening 500 pigs here this year and didn't lose a one. The next question that you may ask is how does John get some stock in the corporation? It's just like any other business. He would have to buy some from me, from one of the other members, or he would have to be given some.

"We g r a d u a l l y expanded. Through the '40's and '50's we added acreage, when we found farms right near us that were for sale. Now we have a total of 1,118 tillable acres."

The Beef-Hog Operation

"Farming is a rush business," says Walter Renk. "We are always looking for ideas that will save us time. Our beef cattle operation has proved to be the one in which we can do most of our work with machinery. With two men on tractors pulling self-unloading wagons and one man at the trench silo loading the wagons, we can feed all of our cattle —as many as 1500 during the year—in about an hour.

"Our cattle buying and feeding program is tailored to the conditions as we see them each

Holstein steers make good beef and feed out well, leaving a good profit for the cattleman, reports Colorado A & M College.

year. To trace through the cattle we sold in the fall of '56, I'll go back to the fall of '55. I went out to Wyoming, Montana, and Nebraska and bought our good cattle. There were 543 steer calves, a v e r a g i n g 420 pounds. They cost us $20.35 a hundred by the time they were on our farm in Sun Prairie. There were 152 heifer calves averaging 342 pounds that cost $18.66 on the farm. There were 88 yearlings averaging 676 pounds, costing $18.56. Then we filled out our lots with the very plain cattle from southwestern Wisconsin and eastern Iowa.. They cost us $12.43 a hundred delivered here. They weigh anywhere from 400 to 700 pounds.

"All heifers must be tested for Bangs, or be calfhood vaccinated, but we don't worry about shipping fever shots. With modern drugs, it is easy to stop any cases that do develop. We start cattle by sorting them by lots, similar in size and disposition. The first feed they get is pure bran in the bunks. This is cooling, bulky and laxative, just what they need after the trip. We give them rough hay. We put baking soda in their drinking water. After a couple of days we put about 1/3 oats into 2/3 bran, about 2 pounds per animal over a period of a week. After a week or so, we turn them out in the cornstalk fields. This is what they like; they are used to the open spaces, and they do well in the winter months without any shelter. After they have seen hogs through fences, we put some in the stalk fields with them. They would be scared of hogs at first.

"We don't usually start feeding silage out of the big 3500-ton trench silo until well into December when the cattle have cleaned up the dropped corn and leaves. Then each one gets 2 lbs of a grain and concentrate mixture on top of 30 lbs of silage. In a normal year our beef cattle would go on a heavier grain ration, just at the time they were put in pasture in May. We would build up the grain to 10 pounds per animal and start feeding stilbestrol, 10 milligrams per animal per day. They would finish on this feed in 4 or 5 months. The steers would weigh around 1200 pounds and heifers 900 to 1000. But this year we had to change our feed set-up; we're flexible on that as well as anything else. With corn at $1.56 ($1.58 a bushel in June) we just delayed going on our heavy corn ration until we had some new corn in August. We still had lots of grass silage so we substituted that instead. This slowed down our gains a little but it saved a lot of money. You see, we count on buying most of this summer finishing corn locally."

"By the time October rolled around last fall we had several hundred cattle ready to sell. And the prices had come back."

Dairying Is Steady

In 1945, the Renks went into a two-farm dairy operation, taking a dive upstream when many dairymen were going into less labor-consuming activities.

Says Walter Renk, "Al Motl started with us then. He is still with us, running the dairy with one other man to help at milking time. We shipped over 500,000 pounds of milk last year. Our 60 Holsteins averaged 386 pounds of butterfat on DHIA test. It's another way to spread our risk.

"We have 92 animals; we milk 42 the year 'round. We have culled and built up our herd on

DHIA testing. Our aim is to go to pen-type housing and eliminate handwork cleaning up behind all those cows in stanchions. We could clean out a loafing barn in half a day and save hours of hard work."

Field Accounts

To get the Renk's field and farming story, look up Robert Renk. He will most likely be either riding or checking one of the farm's 13 tractors or other big pieces of equipment. For example, last fall when the corn crop was yielding 150 to 175 bushels, the old picker just wouldn't do the job. "We tried out several," says Robert Renk, "and the one that worked for us was a new two row Oliver. Hooked behind our Oliver Diesel tractor, it could walk through the heaviest corn without jamming up.

"Our farming year begins right after we get back from the International in Chicago," says Robert." When we get home, everyone pitches in and we take soil samples from every field on the place—no exceptions. We send these samples to the University with these facts: What was on the field last year; manure spread on the field during the year, and what crop goes on it next year. For fields that are going into corn, we ask for a 100 bushel prescription.

'All of this becomes part of our Field Accounting Sheets. There is a master sheet for each year. This lists the 34 different fields, from 15 acres to 80 acres, each with the fertilizer recommendations — broadcast, starter, side-dress required—we get from the University, the lime requirements, the manure we have hauled, and the record of every activity and yield on each field.

"We have found this accounting sheet the most valuable guide in our work. We have to know what fertility we are depositing and withdrawing from each field.

The federal budget for the next fiscal year calls for around 72 billion dollars, of which 5 billion is for the Department of Agriculture.

"We keep complete cost accounting records on all of our farm operations. We have found that we have cut our silage-making costs in half since we went into our 3500-ton trench silo and bulk handling machines. We make silage for $4.50 a ton now, laid in the silo. That includes general farm overhead. Farming is a low-income business and the only chance for a better income is to produce a big volume of the items you are best equipped to handle. We have to be efficient in every operation. We build better efficiency by hiring people who have know-how and

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who want to know how we want to do things. We have 11 men and their families living on the farm the year 'round."

The Corn Business

Wilbur Renk's special province is the production and selling of seed corn. It's a personal job all the way through. In corn-picking time, you'll find him on a stool just ahead of the sheller, checking the endless belt, with its thousands of ears of corn passing by. If he spots a bad ear, he pulls it out.

Selling the corn requires sales meetings around Wisconsin and surrounding states. Wilbur has three full-time sales supervisors and 304 salesmen. "It's a selling job where you can't expand your total market," says Wilbur. "In fact, you've got the Soil Bank cutting it down. You've got to take sales volume away from someone else if you want to grow. That takes quality, service, and every kind of help you can give a customer. We like to have our customers see what we grow on our own fields. We haven't any family secrets we wouldn't be willing to share."

Two years ago the Renks designed a feed mill to tie in with the drying and storage building. These facilities are in constant use. The feed mill makes up fresh feed as it is needed all through the year. The mill and building cost $42,000. Practically all guesswork is taken out of mixing by having automatic weighing switches do the power cut-off when enough of each ingredient is metered out. For large amounts of additives, a time clock device will weigh a measured amount in a predetermined number of seconds.

"Our feed mill is flexible like the rest of the operation," says Walter Renk. "We are on the lookout for new ideas and ways to cut our feeding and production costs. If we run into a high price on any of our feed ingredients then we change the formula, like we did when corn went up last summer. Then we used grass silage to carry us through to the new corn. If we find a new development like stilbestrol, we give it a try, in a small way at first. If it's good, it's put on the program.

Every farmer is faced with the problem of constant rushing—to get plowing done, to get seeds planted, to get ensilage in, to get corn picked. But if he's making money today it is coming from the time he takes to get away from the rushing to stop, think and look for places where he can save a penny a pound on the beef or pork he is producing, or in making a machine do an operation that was done by hand. Any job that we can't do from a tractor seat is under suspicion.

Sound Grain Mixtures for Dairy Cattle . . .

You can save important money with home grown grains . . .

Condensed from Science for the Farmer

Richard S. Adams

HOME-GROWN grains are available on most dairy farms. Dairymen should make efficient use of these grains in their concentrate mixtures. It is important that such mixtures are economically as well as nutritionally sound.

Let us assume there is an adequate supply of corn and oats available in about equal amounts on a dairy farm. The roughage fed on this farm is fair or average in quality and consists of mixed hay, grass and corn silage. Thus, a grain mixture containing 14 per cent crude protein is needed in this particular situation. A sample formula, which would be nutritionally and economically satisfactory, would be as follows:

Ingredient	*Pounds*
Corn and cob chop	800
Ground oats	835
Soybean oil meal	325
Salt	20
Dicalcium phosphate	20
Molasses	0-200

Now let's examine this formula in greater detail:

(1) *Does it suit our grain supply?* Yes, it calls for nearly equal parts of corn and oats. If we had twice as much corn as oats, the formula would be adjusted accordingly within reasonable limits.

(2) *Does it contain adequate amounts of net energy?* Yes, most home grown grains are relatively high in net energy. The same is true for oil meals and good quality commercial supplements.

(3) *Does it have sufficient protein?* Yes, the mixture contains approximately 14 per cent crude protein. This should be adequate to balance the roughage being fed on the example farm. The protein content of the grain mixture should be adjusted according to the type and quality of roughage used. Thus, it will vary from 10 per cent with excellent quality legume roughage to 18 per cent

Reprinted from Science for the Farmer, Pennsylvania State University, University Park, Pa.

with poor quality roughage and corn silage.

It should be added that the protein contained in this mixture is of satisfactory quality for dairy cattle feeding. Since cattle over 10 to 12 weeks of age are essentially functioning as ruminants, protein quality is not a problem in feeding dairy cows. Billions of rumen micro-organisms undergo digestion in the true stomach and intestinal tract of the cow. The amino acids derived from the protein within these organisms effectively complement those found in the feed on normal rations.

(4) *Is there enough variety?* Variety (a large number of ingredients) is necessary from the standpoint of taste only. Since corn, oats and soybean oil meal are relatively palatable feeds, there is no need for more ingredients in the example formula.

(5) *Is it sufficiently bulky?* Under most circumstances, this formula has adequate bulk to keep cows in a slightly laxative condition. Corn and cob chop and oats contain appreciable amounts of crude fiber and should be considered as reasonably bulky feeds. The roughage portion of the ration often provides sufficient bulk for dairy cows.

(6) *Does it include adequate minerals?* The greatest need for minerals in dairy cattle feeding is for salt. This has been included in the mixture. If a trace mineralized salt can be purchased for very little more than common salt, it may be wise to use it as insurance against a borderline trace mineral deficiency. It is difficult to justify the purchase of expensive trace mineral supplements unless a deficiency is known to exist on the farm.

The dicalcium phosphate in the formula is used as a source of supplemental calcium and phosphorus. Sometimes a commercial mineral supplement containing adequate amounts of calcium, phosphorus and trace minerals can be obtained at prices close to that of dicalcium phosphate or steamed bone meal can be fed free-choice.

(7) *Is it an economical formula?* At present, it would be an economical one in many areas. Ear corn prices are reasonable. Oat prices, however, are not as favorable in many sections. As often the case in recent years, soybean oil meal is one of the cheapest sources of protein today. Another oil meal or a commercial supplement could have been used in the example formula if they were more economical.

The cost of the extra mineral supplementation required when using an oil meal should be considered in determining the most economical protein buy. Only a limited amount of molasses, if

any, should be used in the example mixture in view of unusually high molasses prices that are expected to remain for several months.

It should be evident from this presentation that considerable savings can be made through the efficient use of home-grown grain in dairy cattle feeding.

Combination Cooled Bulk Tanks Recommended

Bulk milk tanks using both water and air to cool the compressor seem to be the most economical kind. In tests conducted by farm engineers at the University of Wisconsin, the combination of air and water cooling had several advantages.

Engineers C. O. Cramer and S. A. Witzel say direct expansion tanks cooled with air alone took 45 per cent longer than combination-cooled tanks to cool milk to the required temperature in summer. The water plus air cooling arrangement made it possible to use a smaller compressor than with air cooling only.

A two horsepower compressor is satisfactory for a 200-gallon direct expansion tank cooled with both air and water. A three-fourths horsepower compressor is too small for a 250-gallon ice bank tank with air cooling, but is probably big enough for the same tank if the compressor is water-cooled in the summer.

Ice bank tanks with combination air and water cooling arrangements required less condenser cooling water per gallon of milk cooled than direct expansion tanks with the same compressor cooling arrangement. But the direct expansion tanks used less electricity than the ice tanks.

Combination cooling also helped solve the problem of milk house ventilation in the summer. This is serious with direct expansion tanks because they require large condensers which release large amounts of heat into the milk house over a short period of time. Release of heat from ice bank coolers is spread over a longer time, so is less of a problem.

As far as the type of tank is concerned, the engineers say there are advantages to both. A direct expansion tank costs more than an ice bank to buy and install, but electrical cost may be less.

A farmer buying a 200-gallon tank to cool about 400,000 pounds of milk yearly could afford to pay around $333 more for a direct expansion type than for an ice bank tank of the same capacity, the engineers figure. That's because the savings in electricity would pay the interest and incidental costs for the extra investment. Maintenance costs of both types seem reasonable.

Is The Bushel Measure Outmoded?

Shall we change from bushels to hundredweights for measuring corn and other grain? Here are the advantages . . .

Condensed from CORN

Howard T. Walden II

SOME commodities can and should be measured by volume. The gallon or the cubic foot is a convenient measure for water. For practical purposes neither the seller nor the consumer need concern himself with the water's weight.

For other commodities, mostly solids as opposed to liquids, the weight measure seems preferrable. Grain is a fine example. Theoretically and legally, the bushel is a precise unit, but a bushel of corn weighs 56 pounds; a bushel of oats, weighs only 32 pounds; a bushel of barley weighs 48 pounds, and a bushel of wheat weighs 60 pounds. In the buying and selling of these grains on the customary bushel basis, conversions of bushels to pounds is necessary. Also, in computing the relative feeding values of various grains—how much protein and other nutrients per dollar—a similar translation of bushels to pounds must be made.

If those who grow, sell and buy corn and other grains could forget bushels and think from now on in terms of hundredweights, these cumbersome calculations would be automatically eliminated. This simplification is in fact the expressed desire and intent of many farmers, farm organizations, the grain trade, banks, insurance companies, associations of grain processors and other interested groups.

Corn and wheat millers have long wondered why they should buy their raw-material grain in bushels and then sell the finished products of that grain in pounds or tons. Why not the same measure, buying and selling? The corn-refining industry grinds, for example, about 140 million bushels of corn a year, but its production statistics on starch, syrup, oil, feed, and all else made from those bushels of corn are calculated in millions of pounds or tons. Why not measure intake of raw materials and output of finished products the same way, and avoid

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the need for complicated equations?

The trustees of Corn Industries Research Foundation have formally gone on record as favoring the shift from bushels to hundredweights as the basic official weight unit in marketing corn. Other organizations, after investigating the likely advantages and disadvantages of the change, have generally concluded that the advantages will be permanent, the disadvantages merely temporary. There will be inconvenience during the period of transition, after that, marketing machinery should run much more smoothly and efficiently.

The U. S. Department of Agriculture's *Marketing and Research Report No. 168,* recently published, cites the pros and cons of the move to oust the bushel. The disadvantages, as seen in this report, are chiefly those which always attend any overturn of tradition. People are used to bushels. Farmers and grain traders have lived with the bushel for a long while. They concede its faults, yet they are used to these faults, comfortable with them, and reluctant to replace the known, however imperfect, with the allegedly perfect unknown. Such reluctance to change is of course an essentially human characteristic.

More specific objections are cited, however. Grain legislation, long written in terms of bushels, would have to be revised. Records of the U. S. Department of Agriculture have been compiled in bushels so far as corn, wheat, oats, rye and barley are concerned. Grain-buying firms, grain markets, college agronomy courses, have for generations dealt with bushels in their day-by-day calculations. Farmers who grow corn and other grains have measured their harvests in bushels, and have thought of bushels, never of pounds, in computing yields per acre. The people who build grain silos, storage bins and elevators have measured capacities in bushels, never in hundredweights. A silo that will hold 10,000 bushels of corn will hold 10,000 bushels of any other grain, and never mind what the grain weighs.

When you overturn all that, you pull roots that are deeply imbedded in the customs and mores of agriculture, industry and education. But to deny the change, for such reasons alone, is to deny the validity of any progressive move that involves an about-face of established procedure.

The bushel, *per se,* is not an inexact measure, as many laymen suppose. The so-called "Winchester" bushel, first adopted as a unit in early Anglo-Saxon times and always the standard bushel of the United States, is something

more precise than merely the equivalent of 64 pints, or 32 quarts, or four pecks. It is 2150.42 cubic inches—the volume of a cylinder 18½ inches in diameter and 8 inches deep. It is called the "Winchester" bushel because the original cylinder, to which all others had to conform, was kept in the town hall in Winchester, England. There are other bushels, too, but they are interesting merely as variations from the standard Winchester and have no official sanction in this country. The Scotch bushel, oddly enough, contains 1.491 times as much as the Winchester. The "imperial" bushel, legally established in Great Britain in 1826, contains 2218.192 cubic inches—the equivalent of 80 pounds of distilled water at 62° F. and at a barometric reading of 30.

While the bushel is precise enough, in itself, measurement by bushel has often been inexact. A bushel of corn or oats might be a heaping bushel or it might be the opposite, and likely in small-lot bushel sales shortweight or overweight is more common than exact weight. In the larger transactions of industry this doesn't happen. So many bushels are translated into so many pounds: a purchase of 100,000 bushels of corn is a purchase of 5,600,000 pounds, no more or less.

It is that needlessly time-taking translation of bushels to pounds—and in many industries these calculations are virtually endless—that the proponents of the hundredweight unit seek to remove.

The reasoning is sound. For a temporary inconvenience, while all concerned rearrange their thinking and their printed forms, a permanent simplification can be achieved.

The good old word "bushel" need not disappear from the language. The shy genius may still "hide his light under a bushel," and amorous letter-writers can still sign off with "bushels of love." Indeed the bushel and the bushel basket will likely remain as a sometimes convenient measure—in farm-to-farm grain deals and for tourists who like to buy a bushel of cantaloupes direct from a truck-farmer's field.

Corn Alcohol for 'Gas' Urged

Motor fuel used in this country would be required to contain a minimum of 5 per cent alcohol manufactured from agricultural products under bills introduced by Senator Karl E. Mundt and Representative Ben F. Jensen. They pointed out that corn could be used to make alcohol for gasoline, thus reducing some farm surplus.

How to Measure Corn Yields in Field

1. Pick corn by hand from 1/200 of an acre and weigh the ear corn. Use this table:

If Row Spacing is	Feet of Row for 1/200 of an Acre is
36 inch	72½ feet
38 inch	68½ feet
40 inch	65½ feet
42 inch	62 feet

2. Take a sample of shelled corn obtained from 10 or more of the harvested ears to the local elevator for moisture test.

3. Add 5% to the grain moisture to obtain the ear moisture.

4. Subtract the ear moisture from 100% to obtain the per cent dry matter.

5. Multiply the pounds of wet ear corn by the percentage dry matter to obtain the pounds of dry ear corn. (Pounds of wet ear corn X percentage dry matter equals pounds of dry ear corn.)

6. To convert pounds of dry ear corn to bushels of shelled corn per acre at 15.5%, multiply by 3.4.
   This factor does three things:
   (1) It adjusts percentage of dry matter back to a uniform basis of 84.5% (15.5% moisture).
   (2) It makes the adjustment for the 80% shelling percentage, which is considered average for most corn.
   (3) It converts to bushels per acre.

For more accurate tests, harvest 1/200 of an acre plots from two or more locations in the area of corn you wish to test. Since the number of plants in a given area affects the yield, comparisons of areas or plots that differ in number of plants will not be of much value.

From Farm Crops Department, Michigan State College

Fertilizers Speed Corn Growth and Maturity

In North Dakota tests with an 83-day hybrid, fertilizer paid off more in earlier maturity than in higher yields . . .

Condensed from North Dakota Bimonthly Bulletin

Armand Bauer, E. B. Norum, J. C. Zubriski and Earl Skogley

DURING the 1954 and 1955 seasons, 12 trials were conducted on a variety of soils in North Dakota, testing response of Nodak Hybrid 301 corn to commercial fertilizers. Nodak Hybrid 301 has a relative maturity of 83 days. The corn was checked in hills.

Nitrogen, phosphorus, and potassium fertilizer treatments were applied in the hill by planter attachment and by broadcasting before plowing or seedbed preparation. One treatment included side dressing with nitrogen.

Hill treatments consisted of two rates of phosphorus (20 and 40 pounds of P_2O_5 per acre) as the only treatments, as well as in combination with nitrogen at two rates (10 and 20 pounds of N per acre), with potash (10 pounds K_2O per acre) and in combination with nitrogen (10 pounds per acre) and potash (10 and 20 pounds of K_2O per acre).

A combination of hill and broadcast applications was used for several treatments. The hill treatment (10 pounds N + 40 pounds of P_2O_5) was uniform. The broadcast treatment varied, with 40 pounds of P_2O_5 being applied alone, in combination with 40 pounds of N, in combination with 40 pounds of K_2O, and with both 40 pounds of N and 40 pounds of K_2O. The last named combination was also tested without any hill treatment. In some tests, 40 and 50 pounds of N was sidedressed on corn adequately supplied with phosphorus and potash.

The most consistent reactions to fertilizer were faster early growth, earlier tasseling and silking, and advanced maturity of both vegetative and grain parts. Even though response to treatment was expressed in various ways, there were several cases where there was no accompany-

Reprinted from Bimonthly Bulletin, North Dakota Agricultural Experiment Station, Fargo, N. D.

ing increase in yield. Corn is more sensitive to soil moisture conditions at tasseling through silking stage than at any other stage of growth. Drought during this stage of growth is a highly important factor determining yield. Drought at silking time is thought to be responsible for failure to obtain yield increases in several instances where substantial response was expressed in other growth characteristics. In other cases no yield increase resulted because of inadequate fertility in the later stages of growth.

The maximum increase in yield from fertilizer applied as a hill treatment was about 10 bushels per acre. Increases of this magnitude were observed in trials where moisture was fairly good throughout the growing season. Phosphorus alone was responsible for the yield increase. Neither nitrogen not potassium applied in the hill increased yield. The more rapid early growth occasioned by inclusion of 10 pounds of nitrogen per acre in addition to phosphorus may be worth while, however, if it facilitates cultivation.

In both seasons, corn on all plots matured about a week earlier than those not hill fertilized. Yields were as high on plots receiving only the broadcast treatment as on those receiving the combination hill and broadcast treatment, but the hill treated plots matured earlier, which might be a very significant factor in years of early frost. In instances where soil moisture was fairly good throughout the growing season, combination hill and broadcast treatment increased yield by as much as 24 bushels per acre. No significant increase in yield was found to result from either sidedressing corn with nitrogen or from the use of potash fertilizer.

In some cases stand reduction has resulted from hill application of 20 pounds of N or 10 pounds N + 20 pounds of K_2O. These treatments did not reduce the stand where soil moisture was near field capacity at or within a short time after planting. When fertilizer is applied as bands along drilled corn, more nitrogen fertilizer may be added per acre before any reduction in stand will occur. Rates of 40 pounds of nitrogen per acre have not reduced stands at Fargo when banded along the row.

In many studies of the response of corn to commercial fertilizer it has been found that the outcome varied considerably with varying stands and moisture conditions. In both 1954 and 1955, the yield from four-stalk hills was compared to the yield from three-stalk hills, the increase from the higher population ranging from two to 20 bushels per acre. Three-stalk hills outyielded four-stalk hills only when moisture condi-

tions were adverse, with the maximum difference in yield being five bushels per acre. Ear size characteristically decreases as plant population is increased. It is likely that some of the smaller ears, occurring most frequently with four-stalk hills, will not be saved in picking. This, however, is of little or no consequence where livestock is allowed to range in the cornfield after picking.

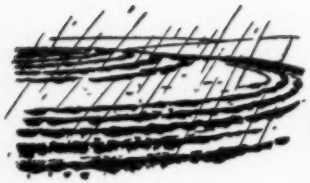
It may be expected that the results obtained in these trials, especially the results from different stands, will apply somewhat differently where corn of relative maturity other than that of Nodak Hybrid 301 is used.

Further research is necessary to establish securely what these effects will be, but it appears likely that with relatively short season corn, the optimum stand will be somewhat thicker than for longer season corn. It would seem that North Dakota farmers who produce corn for grain will realize their greatest profits by growing a hybrid recommended for the area, planted at a rate to give a stand of 12,500 to 14,000 plants per acre, with phosphate or nitrogen-phosphate fertilizer applied either in the hill alone or as a combination hill and broadcast treatment, depending on the general fertility level of the soil.

Conservation Farmer

On paths he loves his contour grain rows go,
His terraces reach straight into the wood,
His ponds pour drink where apple orchards grow,
And shaded brooks run clear of silt and flood.
Beneath his footstep newest clovers rise,
His hand plants forests on the mountain side,
His yields of wheat and corn are tempting prize
Near posted coverts where the pheasants hide.
This ancient soil is his brief trust to keep,
His cherished fruit a morrow's child may need;
And thus he anchors grasslands to the steep,
Whereon perpetual herds henceforth shall feed.
Foresees this father so his son is heir
To richer fields, to hold in prouder care.

—Roy E. McFee in The Rotarian



WATER – A Force in Corn Yield

On a lazy summer day, a thrifty hill of corn plants may jointly transpire a bucketful of water. The soil must deliver into a single corn plant fully 400 pounds of film moisture during the season. Water is truly a resource of corn production.

With the trend toward rising yields and dwindling humus content of soil, the crop's demand for moisture and the soil's capacity to deliver it are growing apart.

To close this gap and increase yield requires loading the land with heavy charges of humus-making organic matter and renewal of tilth by sod roots coupled with the right tillage.

- In Connecticut, 15 tons of manure swelled the film moisture by 55 tons per acre in a dry period.
- Similarly, a 32-ton advantage in usable moisture was had from manure at the Rothamsted Station, England.
- In Licking County, Ohio, prime tilth set up by correct plowing upped corn yield 16 bushels an acre over that had by conventional plowing in the same field.
- Again, consistent use of manure for 42 years at the Ohio Agricultural Experiment Station, Wooster, Ohio, reduced erosion by 170 tons an acre, while 63 per cent of the runoff of rainwater was saved by 16-ton applications of manure in Iowa.

For increased corn yields, build for moisture retention in your soil!

From Corn Yields Climb By Management, The Ohio State University, Columbus, Ohio

What Makes Meat Type Beef?

What happened when prize steers were judged both on the inside as well as the outside . . .

Condensed from Wisconsin Agriculturist & Farmer

THE REAL measure of a beef steer is in the amount of high quality lean meat it produces.

For quality, the meat needs some fat deposited between muscle fibers. This fat, called marbling, improves both flavor and tenderness.

At the same time, the outside fat covering is mostly waste. Take the loin eye muscles in a couple of prize steers, for instance. Both carcasses were in the same class at the International Livestock Exposition.

One steer placed third live but dropped out of the money when carcasses were rated. In spite of what the judges thought, this animal had a small loin and excess covering of waste fat. The other didn't place live, but took over third spot in the actual carcass check. It had a big loin eye and a moderate covering of fat.

Both carcasses had quality meat. But the better one had more meat and less wasteful fat covering.

Differences show up even when steers grow up under identical conditions. Take carcasses from the International Grand Champion carlots shown in the table.

The champions were more uniform than other loads. But there is still a real spread in both loin eye size and fat cover.

The problem is to locate these differences in live animals.

Fortunately, the trained eye may be able to do a lot. A quick

Loin Eye and Fat Cover
International Grand Champion Carlots

Grand Champion Carlots	Loin eye size square inches		Extra meat in big loins per cent	Fat covering inches	
	smallest	largest		thinnest	thickest
1954	10.1	13.1	28.5	0.91	1.69
1955	9.1	13.6	49.0	1.00	1.52
1956	10.5	13.3	26.7	0.91	1.89

Reprinted by permission from Wisconsin Agriculturist and Farmer, Racine, Wisconsin

check of uniform photographs of animals in carcass classes indicates that a deep body is important. Heavy rear quarters help, too. But a pinched flank that hurts in the show doesn't seem to matter much on the carcass.

The ideal seems to be a fast gaining deep bodied steer that is big without being tall. Actually, this may mean less of a change from showing standards than many critics claim.

Probing for backfat doesn't work on beef cattle. It measures only fat thickness. And the loin eye muscle is uneven in shape.

Biggest hope is a radar-type instrument using high frequency sound waves. Fat, bone and muscle reflect waves differently. So it may be possible to get a fairly complete outline of the entire loin cross section.

Apparently, loin eye size, fast gain and tenderness are all heritable to some extent. So successful selection for those qualities should be possible.

This can put beef breeders on the right track along with meat type hog men.

What better way to keep a market than to give the consumer what he wants.

Ketosis Not Prevented With "Feeding"

Feeding of many compounds has been recommended to prevent ketosis—a troublesome problem with dairy cows. None of these has proved satisfactory, says Vearl Smith, dairy husbandman at the University of Wisconsin.

If cows are well fed and managed according to accepted practices, you can do nothing more to prevent ketosis. It occurs in the best fed and best managed herds, says Smith.

A fairly high percentage of cows with ketosis will recover spontaneously, says Smith. Treatment should be in the hands of your veterinarian. Best results have been obtained with ACTH or hormones of the adrenal glands, cortisone and hydrocortisone.

Smith explains that ketosis, or acetonemia, is a condition caused by abnormal metabolism of carbohydrates in dairy cows.

Ketosis is seasonal. It is much more prevalent during the winter feeding period than when cows are on pasture or green feed. As many as 50 per cent of the cows in a herd may show symptoms. Ketosis usually occurs from a few days to a few weeks after calving, most frequently the third week after calving.

—Wisconsin Extension

Cribs and Bins Pay Off

Corn prices average 14 to 22 cents higher the summer after harvest. If the corn sealing program is abandoned, you'll need storage even more . . .

Condensed from Wallace's Farmer and Iowa Homestead

DOES it pay to build cribs for storage?

For the 10 crops, 1945-1954, corn prices averaged 14 cents higher the next May than in November. Price gain was 22 cents per bushel comparing November with the next September.

These differences are from prices received by farmers as reported by the U.S.D.A.

Now the question is; what does storage cost? Can you afford to store for these average price gains? And are there other advantages from farm storage?

Cost of storing ear corn on the farm can be figured fairly close. Say the cost per bushel capacity of a permanent crib is 80 cents, and the crib will last 25 years.

Depreciation would cost a little over three cents per bushel per year. Then you'd have to add interest on undepreciated value, repairs, taxes and insurance.

Iowa State College specialists have estimated the total cost around 10 cents per bushel. Sometimes above and sometimes below.

You can figure these costs for your own farm. Or perhaps investigate storage charges at elevators. But of course you have to dry corn at harvest time to shell and store in elevators.

Now if the cost is around 10 cents, you'd make four cents per bushel in the average year holding corn from November to May. But you'd make 12 cents per bushel by holding from November to the next September.

Shrink would have to be considered, of course, but the gain in quality of corn should offset that. Heavy docks are enforced on wet corn.

These figures, however, don't tell the whole story. You need some kind of crib or bin even if you sell corn at harvest. So you are going to have some storage cost in any case.

In years when corn has unusually high moisture content, drying bins and equipment will be required. You may want to dry the corn anyway, but much more moisture must be removed if corn is to be sold rather than

Reprinted by permission from Wallace's Farmer and Iowa Homestead, Des Moines, Iowa

stored thru the winter.

In fact, it just isn't practical to count on selling corn from the field each year and avoid all storage costs. So the actual profit in holding corn into the next summer will average greater than the four or 12 cents indicated.

Then there are possible advantages from farm storage in addition to market price gains.

With good corn storage units you can use the government corn sealing program. That has meant 10 to 30 cents per bushel in recent years.

If the corn sealing program should be abandoned, the profit on holding corn until the next summer would increase greatly. Harvest time prices would be worse than now. You'd need cribs then for sure.

And storage enables you to hold one crop until another is assured. That is important if you produce livestock.

When all is considered, cash returns from holding corn plus side benefits make ownership of cribs and bins good farm management.

A Farmer's Prayer

By Samuel R. Guard,

Editor of Breeder's Gazette

Our Father in Heaven, this heat is good for the corn, and we are glad when we can sup outside.

We gratefully eat of the bounty that Thou has given us from out of yon garden, field, pasture, barnlot.

For our unalienable rights of Life, Liberty and the Pursuit of Happiness we thank Thee, our Creator.

We pray, and work that these blessings may be to all Thy children the world around.

And as we come to select a captain of the host, we remember what Thy wise servant said of old: May the lot causeth contentions to cease, and parteth between the mighty.

Amen . . . Amen.

Treat Your Corn Land for Soil Insects

Here are ways to apply insecticides . .

Condensed from Nebraska Farmer

Robert E. Roselle

YOU can't afford to gamble with soil insects when your corn profits are at stake.

Insect pests of the corn plant which damage the seed, seedling, or growing plant below the soil surface are quite numerous. Corn rootworms, corn seed beetles, seed corn maggots, and corn root aphids have all taken an important toll of our corn yields in recent years.

All are insidious workers, doing their damages out of sight,

Ulcers are caused not so much by what you eat as what's eating you.

and often destroying many acres of corn before we are even aware of their presence.

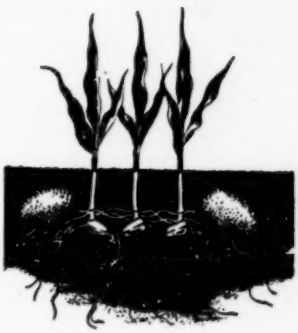
Fortunately we have adequate preventative measures for most of them.

Corn Rootworms

The most important of soil insects are the three species of corn rootworms. Although quite different in the adult (beetle) stages, they all cause the same type of damage to corn roots.

Small rootlets are eaten away completely, larger roots and underground portions of the stalk are tunneled into, allowing entry of soil-borne diseases as well as the damage they cause directly.

Soil insecticides have provided spectacular control of these insects, resulting in millions of dollars of additional income to farmers.



If you choose a starter fertilizer-insecticide mix row treatment, use a band on each side of the seed for best results from the insecticide.

Current recommended insecticides and amounts per acre for

Reprinted by permission from Nebraska Farmer, Lincoln Nebraska

corn rootworm control are:

Insecticide & Formulation	Amount per acre Broadcast	Row
Aldrin (4 lbs. per gallon)	1 quart	1 pint
Heptachlor (2 lbs. per gallon)	3 pints	1 quart
Aldrin (2 lbs. per gallon)	2 quarts	1 quart
BHC (1 lb. per gallon)	3 quarts	(Not recommended)

Broadcast treatments are applied with ordinary crop or weed sprayers, mixing the insecticide with enough water to cover evenly, usually 5 to 10 gallons per acre. When used this way the spray must be worked into the soil immediately with a disk or by shallow plowing. If left exposed to the wind and sun, the insecticides evaporate or deteriorate rapidly.

Row sprays may be applied by attaching a nozzle so that the spray is applied in the row at time of planting.

The spray should be adjusted so the fan is about eight to twelve inches wide and applied in front of the covering disks of a lister, or just behind the planting shoe of a planter. Apply the chemical in water at the rate of three to five gallons per acre. Sprayers converted for row spraying can be calibrated by driving the tractor a measured distance then measuring the water that is sprayed.

Soil insecticides may also be applied with starter fertilizers. This method should only be used when both a starter fertilizer and soil insecticide are recommended.

If used, a band on both sides of the seed should be applied for best results from the insecticide. Use enough to provide at least one-half pound of the insecticide per acre. Most fertilizer-insecticide mixtures have one-half pound of insecticide to 100 pounds of fertilizer. Other mixtures may be available by custom mixing.

Two years ago, granulated aldrin and heptachlor entered the field for corn rootworm control. Although this method has not been tested extensively in Nebraska, they have been tested in other mid-western experiment stations with satisfactory results.

Use 2½ pounds of 20 per cent aldrin or heptachlor per acre in special applicators. Several applicators are available with a wide range of prices.

On dry land corn following drouth years, the cost of applying a preventative insecticide is very important. A reasonable-priced and dependable control is a must. With this in mind, the row sprays or granules are the most economical.

A spray in the row can be applied for as little as 85 cents per acre, while broadcast sprays, including the estimated cost of applications, may run $3.00 per acre, or more.

Row sprays are effective one year, while broadcast sprays prop-

erly applied on dry land may provide two years of control.

Corn in rotation generally will not require corn rootworm treatments if the field has been free from volunteer corn; however, other soil insects may be present.

The 2-4-6-8-10 system with pigs is excellent. At 2 weeks, creep feed. In 4 weeks, castrate. In 6 weeks, vaccinate for cholera. In 8 weeks, wean. In 10 weeks, worm treat the pigs and use lindane for lice and mange. Move all litters after farrowing onto clean legume pasture.

Maggots and Beetles

Seed corn maggots and corn seed beetles are primarily pests of the germinating seed, causing an early stand reduction. Seed corn maggots are common in Nebraska. Corn seed beetles normally feed on other insects in the soil, but occasionally, become pests when other food is not plentiful.

Corn rootworm controls will control both of these seed insects. If rootworms are not controlled, the seed should be treated with an insecticide before planting.

Aldrin, dieldrin, heptachlor or lindane may be used as a seed treatment. Use one of them according to package directions. If lindane is used, apply just before planting as this chemical may injure germination if left in contact with the seed out of the soil too long. Seed treatments are not satisfactory for corn rootworms.

Wireworms

Wireworms feed on the germ of the seed, and will continue to damage plants by feeding in the stalks below the soil surface. They are more difficult to control than other soil insects.

Light infestations will be controlled by the row sprays recommended for corn rootworms, but moderate to heavy infestation require larger amounts of insecticides. For row sprays in fields which were damaged by wireworms the previous year, use one pound of aldrin or heptachlor per acre.

If broadcast treatments are used apply two to three pounds per acre depending upon the infestation and soil texture. Heavy soils usually require more insecticide per acre.

Wireworms usually are found in fields which have been planted in sod ground, or grassy stubble fields. They are sometimes found in corn fields which have been infested with grassy-weeds the previous year or two.

They may require more than one year to mature, so damage from the same infestation may last more than one year. The adults of wireworms are click beetles, the brown beetle about ½ inch long which will "click"

with a jump to right itself when placed on its back.

Corn Root Aphids

Little is known about chemical control of corn root aphids. Usually controls are aimed at the corn field ant which places these aphids on the roots of corn. The aphids produce an excretion which the ants eat. They are sometimes called "ant cows."

The old recommendations for control were to plow the fields deep in order to tear up ants nests, and rotate fields. Recent observations would indicate that corn rootworm control will provide at least partial control of the these aphids by controlling the ants. After an infestation has developed, nothing is known at the present time that will control them satisfactorily; however, if corn is replanted then one of the rootworm controls should be applied.

If anyone has been plagued with this insect and wishes to try a control especially for them, he could use two pounds of actual chlordane per acre (½ gallon of 4 lb. per gallon emulsion) broadcast and disked into the soil. This would also control rootworms, seed corn maggots, and corn seed beetles.

Bulk Tank Check List

Dairymen should consider ten important questions when they are thinking about buying a farm bulk tank, advises Prof. A. J. Morris, head of the Utah State's dairy industry department.

1. Is the herd of sufficient size that a bulk tank will be justified?
2. Is the milk house big enough to house the tank and big enough to operate in?
3. Will the bulk tank meet with the approval of local and state regulatory agencies? Will it meet 3A standards?
4. Is the tank large enough for future expansion of the dairy herd?
5. Is the tank easy to clean and sanitize?
6. Is the tank guaranteed against sagging and bulging so it will not need to be recalibrated?
7. Is the tank calibrated accurately?
8. Is there a suitable guarantee on working parts such as the motors, compressor and control mechanisms?
9. Are the operating mechanisms and controls readily accessible for adjustment and repairing?
10. Is there dependable local service available for the tank when repair service is needed?

—Utah State College

The South's Boom in Pig Feeding

Will the South's new hogs make the corn belt step? Midwestern hogmen took a look and decided, "If we're going to meet this competition, we've got to have meatier hogs and a better idea of our costs."

Condensed from Farm Journal

John A. Rohlf

THERE'S a fast-growing new business in the South — pig feeding. More than 2,000 "pig parlors" have been built in the last year and more are coming.

Farm Journal told about this new trend in their April issue and Farmer's Digest carried the article in May. Their editors raised the question as to whether this boom might shake up the hog business; possibly break the near monopoly on pork raising now held by the Corn Belt.

To get some answers they asked six top Corn Belt hog men to take a first-hand look. This is the group answer:

"Before we went South, we doubted they had much of a chance. Now we aren't so sure. Most southerners know little about raising hogs, but neither did they know broilers when they went into them 15 years ago. Now they lead the country simply because they can produce cheaper. *The same thing could happen with hogs.* It will probably take at least three to five years to tell. But we were impressed."

What did the midwesterners think they should do to meet this new competition?

"Get rolling on a meatier hog," said La Verne Johnson, who raises 1,500 hogs a year in DeKalb County, Ill. "If we don't, those Dixie boys could really make it rough on us."

"And we've got to keep better records to know what our costs really are," added Flint McRoberts, who sold 175 tons of pork and beef off his Lewis County, Mo. farm last year.

"That fellow with 50 hogs back in the pine woods of Alabama has a better idea of his costs than any of us on this trip have of ours."

Johnson elaborated on his point: "The South has been a good overflow market for our fat pork. If they keep going, they could plug that outlet with their own hogs pretty fast. It looks to me like the fellow who can pro-

Reprinted by permission from Farm Journal, Philadelphia, Pennsylvania

duce the meatiest hogs cheapest is going to win out. We've got a head start, but they've got some smart boys raising hogs down there."

Here are some of the other things the Corn Belters saw that made them wonder about the future of their own business:

■ *Costs.* I'd play hob trying to get pigs through a winter at home with this kind of shelter," said John Olson, Nobles County, Minn. purebred and commercial man, after seeing a 50-sow farrowing unit in central Georgia. "It cost that man one-third what it would cost me, yet his record of pigs saved is as good as mine."

"But apparently labor is no cheaper," pointed out L. L. Stewart, who raises 2,000 hogs a year in Clinton County, Ind. "The southern farmer has plenty of competition from factories, too. We talked with some who were having to pay $50 a week and keep for help that knew very little about raising hogs."

■ *Credit.* "It surprised us how easily a farmer apparently can get money to build a feeding parlor, buy sows, feeder pigs and feed," observed William Sayre, who plans to farrow 1,200 pigs this year on his Warren County, Iowa farm.

"It would seem that southern credit agencies are making a sincere attempt to help farmers up their income. Don't under-rate 'em."

■ *Slaughtering facilities.* "I don't believe any of us were aware of the killing capacity of southern plants," said Leslie Johnson, head of Iowa State College's animal husbandry department. "We were told that the South now ships in more than a half million hogs on the hoof for slaughter. They've got plenty of places to kill 'em.

■ *Feed supply.* "Apparently feed isn't going to stop 'em either," said Bill Sayre. "Government programs have forced greater corn acreage on some of the land that used to be in cotton, peanuts, etc., and there's no doubt they can get good yields with enough fertilizer and adapted hybrids. Besides, a lot of the South can be reached by barges carrying our Midwest corn. They are buying it down there now for little more than I have to pay at the elevator, right in the middle of Iowa."

■ *Off-peak farrowing.* "Our toughest farrowing months can be their best," believes John Olson. "Top men we talked to weren't farrowing during their hot months—July and August. So they were missing the low December-January market. But they were farrowing heavily in Novem-

ber, December and January and hitting good markets."

■ *High-quality feed people.* All of the Corn Belt men were impressed with the genuine desire of feed dealers to help farmers get into hogs and make more money.

"We're trying to show our customers that they can double the amount of money from their corn crop if they'll feed it out rather than sell for cash," Alvin Butler, a dealer in Scottsboro, Ala. told them. Butler is backing his idea with a dozen demonstrations in his area in which he's financing a "complete package" on farms to get farmers started in pig feeding. That is, he buys the feeder pigs, furnishes all feed and medicines, pays the farmer 2 cents a pound for the gains. And he's brought in 150 purebred sows to relieve a shortage of local feeder pigs.

In Siam, monkeys are trained to pick cocoanuts — either green or ripe, according to command. They often gather 600 per day per monkey.

Those are some of the things that made the Corn Belt men think hog raising may have a real future in the South. But what about the problems?

■ *Feeder pigs.* "Finding enough good ones is their biggest problem," said L. L. Stewart. They need a pig-hatchery type operation to keep those parlors full. With all of the experience we think we have in the Corn Belt, we couldn't make a go of 'em. I'd hate to think that these newcomers could — but maybe they can."

■ *Meatier hogs.* "We need a leaner hog in the Corn Belt, but they need it worse here," said John Olson. "Feed dealers or banks could help by bringing in good-gaining, meat-type boars. And they probably will."

■ *Parasite and disease control.* "This is a parasite's paradise," observed Bill Sayre. "The most successful operations we saw were on concrete all the way, for market hogs. That's ironic with the year-round pasture they can raise."

"These new fellows, particularly the sow men, are bound to hit some rough disease problems," added Stewart. "Whether they can ride 'em out remains to be seen. That depends upon both desire and finances."

"I wonder if these fellows would stick it out through a couple of rough years of hog prices," mused La Verne Johnson.

"That will be the answer," the others agreed.

Can Cows Maintain Pasture Fertility?

Tests show cows do a poor job of spreading manure . . . . suggest that you include fertilizer in your pasture program . . .

Condensed from Crops & Soils

W. W. Woodhouse, Jr., R. G. Peterson and *H. L. Lucas*

ANY TIME now, cows will be out on the pasture in all dairy sections of the country. From then on, most of their abundant, nutrient-rich manure will be left on the pasture.

That brings up the question: How good is the dairy cow in maintaining pasture fertility? We know the value of her manure when it is carried back to fertilize the fields where her feed was grown. But what is its performance when she spreads it on pasture herself?

Studies in North Carolina during the past several years indicate that grazing cows do a *poor* job of fertilizing the pasture. This is true in spite of the fact that manure contains large quantities of nitrogen, phosphorus, and potassium.

About 75 per cent of the nitrogen and 80 to 90 per cent of the potash in the feed a cow eats normally pass through the animal. A cow produces an average of 76 pounds of manure daily—56 pounds solid and 20 pounds liquid. The solid portion contains 0.38, 0.18, and 0.22 per cent nitrogen, phosphate, and potash respectively. The liquid portion contains 1.1, 0.01, and 1.15 per cent nitrogen, phosphate, and potash.

When grazing is continuous, all this rich manure is deposited at some point in the pasture. For this reason, some people have felt that manure must surely have a major beneficial effect on pasture fertility.

The key to this question lies in the manner in which the manure is distributed over the pasture.

Each individual deposit fertilizes only *a small area at a high rate.* The solid manure covers 1 square foot and the liquid portion about 3 feet. Up to 700 pounds of nitrogen and 400 pounds of potash per acre are applied to each of these small areas. Most of the phosphorus is in the

Reprinted by permission from Crops & Soils, 2702 Monroe Street, Madison 5, Wisconsin

solid manure and amounts to about 350 pounds per acre in each application.

Only a small part of the total area is covered at any one time. We have found, for example, that after 2 years of continuous grazing, with 1 cow per acre, only 40 per cent of the pasture area would be covered one or more times by manure.

To make matters worse, the manure is not distributed uniformly over the pasture, but tends to concentrate near shade, water, and gates. Thus, after 6 years of continuous grazing, with 1 cow per acre, 20 per cent of the pasture will not be covered at all, while 16 per cent will have had 4 or more applications.

So much for the distribution. Now what about the soil fertility in the root zone under a single manure deposit. Immediately after application, the concentration of nitrogen, phosphate, and potash will be high. But with time, plant use, leaching, and other processes will lower this high concentration of nutrients under each small manure spot.

In North Carolina, about 40 per cent of the nitrogen and 10 per cent of the potash are lost each month from the manure spots. Eventually, this lowers the fertility level under this small spot to such an extent that it no longer has an important effect on pasture fertility. We assumed this point to be below 10 pounds per acre for nitrogen, and 20 pounds per acre for potassium.

As grazing continues, a point is reached sooner or later, when the loss of nutrients from old manure spots and addition of nutrients in new manure deposits becomes equal. From then on each new manure deposit is matched by one just passing out of the fertility picture.

Thus, while the location of individual spots changes, the pasture area having various levels of plant nutrients from manure remains constant. For nitrogen, this equalized condition is reached after about 9 months of grazing, and only 16 per cent of the pasture will be affected by the extra fertility at any one time.

Since potassium is lost less rapidly from the root zone, its leveling-off point occurs after about 30 months of grazing, and only 37 per cent of the pasture will be benefited by the extra fertility at any one time.

These North Carolina studies explain why farmers in the humid, eastern United States have not had much success in depending on grazing cattle to keep pastures fertilized. Cattle highly fertilize small areas in the pasture. The trouble is that only a small part of the total pasture area is fertilized at any one time. Also, one application fails to keep up the fertility level of each spot

until the cow gets around again.

As a result, if farmers graze at the rate of 1 cow or less per acre, in our climate, they must pretty much disregard the fertilizer in the manure when planning commercial fertilizer application. Additional fertilizer would be needed to maintain good fertility levels in pastures, just as in hay fields.

Perhaps the best possibility of cashing in on the fertility in manure applied by the cow is with high producing pastures and if you graze at a rate of more than 1 cow per acre. Other favorable conditions would include reduced leaching conditions and pasture mixtures which do not use "luxury" or excessive amounts of fertilizer. All of these conditions combined could raise and maintain the fertility level of the pasture—after several years. This would be true especially for phosphorus and potassium which are lost from the root zone at a slower rate than is nitrogen.

Scattering the solid manure spots may help distribute the phosphorus but would have little effect on nitrogen or potassium, since 55 per cent of the nitrogen and 70 per cent of the potassium is in the liquid manure. Moreover, this would have to be done every few days or just before rain or irrigation, and it could be a costly labor item.

These studies from North Carolina indicate that when you turn your cows out this spring, you should think about including pastures in your overall fertilizer program.

Hog Prices May Go Lower Next Fall

Minnesota hog farmers are warned that, despite expected higher prices this summer, 1957 may not be a good time to expand in the pig business.

Hog prices may go as low as $13-14 per hundred pounds when large numbers of spring-farrowed pigs reach market next fall and winter, says Ermond Hartmans and Hal Routhe, Minnesota farm management specialists. With efficient management, though, producers will be able to make a better profit in hog production at these low prices than they could have in winter 1955-56.

That, say the economists, is because we can expect corn this fall to be cheaper than it was in the winter of 1955-56, and the hog-corn ratio" should remain favorable for making a profit. This "ratio" is the number of bushels of corn you can buy with 100 pounds of pork.

—University of Minnesota

New for You . . . *The Editors*

New Grade and Yield Hog Appraisal Contest Yields Fun and Information . . . A new type contest first tried at the Fort Dodge (Iowa) Market Hog Show this spring, reveals influence grade and yield exert on actual value. Committees of ten hog producers sit in bleachers on each side of the show arena and appraise each of 20 hogs as they are presented individually. Each is provided with market quotations for U. S. No. 2 hogs of the respective live weights. Committees take turns appraising. As each committee's appraisal is announced, the other committee exercises the option of accepting or rejecting. If they think the hog worth more, they accept. If less, they reject. If accepted, hog is placed on their own kill sheet. If rejected, the committee making the appraisal places hog on kill sheet.

The contest at Fort Dodge revealed exactly half of each group had killing values above appraisal. One hog was appraised $1.35 per cwt. low, another $1.36 per cwt. high. Some fun—write to Hormel Farmer, Austin, Minnesota for details.

PEN-FZ . . . is the ingredient in a new, handy, disposable one-dose syringe for the treatment of mastitis developed by Hess and Clark, Inc., Ashland, Ohio. The syringe holds the correct Pen FZ dosage for the application to a single infected quarter. Rinsed out after using, the applicator makes a handy, dandy oiler or greaser for hard-to-get-at parts.

Do Meat Packers Make Too Much Profit? . . . Hobart Creighton, livestock producer of Kosciusko County, Indiana, doesn't think so. He gives a complete discussion of packer earnings in a free booklet called "Profits in the Meat Packing Business." For free copy, write to Agricultural Research Department, Swift & Company, Chicago 9, Illinois.

No Business Like Show Business . . . Your calf's ring manners tell everybody just how much time you've spent teaching him to look and handle like a winner. Experienced salesmen know that "merchandise well displayed is half sold." For details on fitting and grooming, write Earl Sinderuse, Ralston Purina Co., 557 Checkerboard Square, St. Louis, Missouri.

Plastic Pipe Brochure . . . Crescent Plastics, Inc., 955 Diamond Ave., Evansville 7, Indiana, has a

comprehensive explanation of the three basic types of plastic pipe —flexible, semi-rigid, and rigid. Advantages, methods of installation, the many applications as well as the points to consider in selecting the proper type of pipe for any particular job, are explained.

Rake Trash Into The Open Furrow as you plow with a hexagonally shaped Roto Rake developed by Olson Mfg. Co., Albert Lea, Minnesota. Attached by a chain to the plow beam it revolves behind the plow filling the open furrow with the corn stalks, straw, soy bean vines, etc. It helps keep the plow clean and allows it to cover all the material on the next round. Two models available for 2 and 3 bottom plows.

Some people are like fences — run all over creation, yet wind up where they started from.

Insect Spray Chart . . . Hanson Equipment Co., Beloit, Wisconsin, offers a file folder containing an easy identification insect spray chart, information on how to spray, and what chemicals can be used to protect fields from crop damaging insects. All common insects are listed along with illustrative colorful drawings.

Drying Grain With a Heat Pump is like having your cake and eating it. The heat pump working on the principle of the home refrigerator takes heat from the grain bin and uses this heat to warm the drying air that's blown into the bin to dry the grain. Agnold Flikke, Ag Engineer at the University of Minnesota, is testing the idea and says it will be practical where large amounts of grain must be dried under closely controlled conditions.

"Barns for Better Dairying" and "Steel Buildings for Better Farming" are two 16 MM sound and color films available at no charge for use at farm meetings through Film Distribution Center, United States Steel Corp., 525 Wm. Penn Place, Pittsburgh 30, Pennsylvania. "Barns" is a University of Wisconsin Kodachrome film report on ten years of Dairy Barn Research. "Steel Buildings" deal with use of steel buildings in various parts of the country.

Let Decker do it for you . . . their new self-unloading wagons take the shovel out of your hands and the ache out of your back. Side delivering you merely need to drive the wagon alongside the feed bunks and the PTO unloads the feed and silage. Write Decker Manufacturing Company, Janesville, Wisconsin.

Progress Report on Wheel Track Corn Planting

Researchers predict 90% of Wisconsin's corn will soon be planted in tractor tracks . . .

Condensed from the Wisconsin Bulletin, Wheel Track Corn Planting

A. E. Peterson, J. T. Murdock, I. O. Berge, D. R. Peterson

PLANTING CORN in the tractor tracks is a promising new idea in corn culture. It saves labor and the soil because it requires less seedbed preparation and cultivation.

With this method, corn is planted on freshly plowed ground in a seedbed prepared by the wheels of the tractor, thus eliminating disking and harrowing.

Although seedbed preparation is necessary to get good germination of corn, the seedbed does not need to be prepared between the rows. In fact, germination has been higher on wheel track planted fields than on those receiving conventional preparation.

Consider These Advantages

Conserves Soil: There is less soil compaction by tillage operations. Also, the rough, loose soil left between the rows absorbs water readily. Thus, more moisture soaks into the field and runoff is reduced. Erosion may also be reduced on old hay and pasture fields because the sod cover is left on the field longer.

Uniform Corn Germination: Planting corn in the tractor track will improve corn germination, especially in dry years. The corn is planted in the direction of the plowing and since there are no tracks or tillage operations across the corn row, depth of kernel placement is very uniform. The freshly plowed furrow usually contains enough moisture so the seed germinates rapidly. On the other hand, conventional seedbed preparation often hastens soil drying so much that the corn germinates poorly unless it soon gets rain.

Weed Control: With conventional seedbed preparation, the weed seeds normally have one to two weeks head start on the corn seed, which means that it is usually necessary to cultivate the corn when it is very small. This

Reprinted from Wheel Track Corn Planting, published April, 1957 by University of Wis., Madison

cultivation may kill many corn plants unless done with utmost care.

However, with wheel track planting, the corn and weed seeds in the row begin to germinate at the same time, while the weed seeds in the loose soil between the rows remain dormant. Therefore, the corn is usually 6 to 12 inches high before cultivation is necessary. Spraying with pre-emergence weed killers, broadcast or over the wheel track, delays this first cultivation even further and may entirely eliminate cultivation for weed control.

Bigger things are sometimes easier to do than smaller things, and encounter less competition.

The first cultivation may be very rough if sod has been plowed down without first being disked. A rotary hoe, plow packer, or small drag attached behind the plow will help avoid this condition.

Cuts Planting Time and Costs: Elimination of disking and harrowing reduces out-of-pocket expenses for fuel, maintenance of equipment, and for the labor which is so critical during the planting season. And the delay or elimination of cultivation also saves time and money.

Comparison of the wheel track and the conventional corn planting can save about $5 per acre, or 40 per cent of tillage costs. Here is a breakdown of the costs.

	Conventional	Wheel Track
Plowing	3.00	3.00
Disking	2.80 (2)	
Harrowing	1.00	
Planting	1.40	1.45
Cultivating	3.60 (3)	2.40 (2)
Total	$11.85	$6.85

Sod Cover and Manure Well Used: In most of Wisconsin, corn is planted on fields that have been in hay or pasture. If this sod is left until corn planting time before it is plowed, it provides more green manure. It also helps to dry and warm wet soils because the grass will transpire much more water than evaporates from bare soil.

Plowing at planting time means more efficient use of barnyard manure in two ways. First it gives the farmer more time to spread manure before plowing. And second, manure which is plowed under will decompose more rapidly, releasing plant nutrients for crop use.

Where Is It Useable?

Field experiments on all major soil areas of Wisconsin indicate that this method will work whereever it is possible to spring plow for corn.

Machinery Adaptations for Wheel Track Planting

It is necessary to narrow the rear wheel tread (spacing) of

most tractors to the minimum setting provided by the manufacturer so that the tracks made by the tractor wheels will coincide with the corn planter row spacing. While a difference of 4 inches between the wheel spacing of tractor and corn planter may be acceptable, the spacing should be identical if possible.

The lowest official temperature ever recorded in the continental United States—70 degrees below zero occurred at Rogers Pass, Mont., in 1954.

Danger of Tipping Tractor

Using narrow wheel spacing greatly reduces the stability of a tractor. Only adults who know this should operate the tractor. They should use low speeds when turning and use care when one wheel encounters a dead furrow, stone, ditch or other obstruction. Hillside operation should be avoided.

Two-Row Planters

Low tractors, sometimes called "utility type," can be narrowed more safely than the higher clearance row crop models. Some of these models can be narrowed to a 48 inch rear wheel tread. If the row spacing on the corn planter can be increased to 44 inches, the arrangement should be satisfactory. The cultivator must also be readjusted to the increased row spacing.

Four-Row Planters

The use of two-row planters and cultivators is necessarily limited to smaller acreages. Farmers who have four-row planting and cultivating equipment will want to continue four-row operations even with wheel track planting. Below are some ways to modify tractors for wheel track planting.

1. Use a tractor where the rear wheel tread can be narrowed to within 4 inches of the corn planter row spacing. Extend the front axle to a 120 inch tread. Use larger tires on the front, preferably 8 inches or wider to help compact a larger area and fill them with fluid.

2. Another method is to use a tractor where the rear wheel tread narrows to within 4 inches of the corn planter row spacing and add an extra pair of rear wheels to make tracks for the outer two rows of a four-row planter.

3. Another variation is to use a support across the tractor on which guides and wheels something like bicycle forks are hinged.

4. With a tractor of the tricycle type, set rear wheels to 80 inch tread. Space them so the track they make is 40 inches each side of the track made by one of the front wheels. This will form tracks for three of the corn rows. The track for the fourth row can

be made by mounting a wheel on a framework to make a track 40 inches to one side of a rear wheel. The planter must be hitched off-center so the furrow openers will match the wheel tracks.

5. Another very promising possibility which could be provided by tractor manufacturers is a tractor front end which can be adjusted to a 40 inch tread with the rear wheel tread extended by special axles to 120 inches.

6. Finally a four-row self-propelled corn planter could be made with large rubber tired wheels ahead of the furrow openers. Two wheels would be driving wheels and two free floating. All wheels would need to be weighted for good compaction. A 15 horsepower engine should be adequate.

Steps in Wheel Track Planting

1. *Plow and Plant the Same Day.* Plowing the field several days before wheel track planting is bad because it allows the topsoil to dry out—moisture needed for germination is lost. This drying of the soil also prevents the compaction needed to insure a good seedbed.

2. *Adjust Width Between Tractor Wheels.* Make sure that your machinery meets the requirements of one of the planter adaptations.

3. *Follow Good Cultural Practices.* Always plant adapted varieties. You may want to consult your county ag. agent for information. Wheel track planting works without pre-emergence weed application. However, if you plan to apply a weed killer, it is best to apply it when planting the corn.

Wheel Track Worth Trying

For years we have felt that a good corn seedbed is one where the field is disked and harrowed until it has a smooth loose surface. But this isn't so. Actually the corn seed is only affected by the condition of the soil 2 to 3 inches on either side of the seed. Wheel track planting provides this seedbed and leaves loose rough soil between the rows which helps to reduce soil erosion and discourage weed growth.

Mastitis Is Important

Bovine mastitis continues to be the major disease problem facing dairymen, despite broad attacks made by scientists and farm management experts. If it were not for the milk losses due to mastitis, one half the present cow population could supply all current dairy product needs, according to USDA estimates. USDA reports that six million of the 24 million dairy cows of milking age are continually affected by the disease.

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Champion Geese Make Good Watchdogs

About geese that replace Old Rover, weed the orchard and live 27 years . . .

Condensed from California Farmer

Marie T. Walsh

OLD ROVER had better look to his laurels, for the fact that geese make good watchdogs —especially White Chinese geese —as well as good weeders for orchard or pasture land is making many ranchers look upon them with a speculative eye.

Out at Temple City, California, Dorothy Locklin has been raising geese for quite a time. A 1½-year-old goose and gander took first and second prizes at the Los Angeles County Fair in 1955 and an old gander never before shown, brought home a first prize. But prizes are not new for Dorothy's stock. She once had a Toulouse goose that placed "best of show" for eight years running and a grand champion goose that was 27 years old!

But of all her geese during her years in the hatchery and meat bird business, Dorothy looks with a fond eye on her White Chinese, the streamlined, snowy beauts that resemble swans without the latter's on-land awkwardness.

Compactly built, with rounded body and long, slender neck to give them a swanlike appearance, they are the small, plump members of the goose family; adult ganders weigh up to 12 pounds each; adult geese tip the scales around 10 pounds each.

Dorothy has given up the meat angle in favor of hatching from her 40 to 50 breeders, each of which lay, in their prime, from 30 to 80 eggs per goose during the November to June laying period. She also custom hatches—not stopping at goose eggs—for she has custom hatched every kind of an egg from an ostrich to emu and swan to countless bantams.

In the hatchery this modern Goose Girl uses 14 old flat-top-type chicken incubators, each of which holds 360 chicken eggs. Easily converted to game-bird or other poultry hatching, she places 200 goose eggs per incubator. And from the time the eggs go in until they hatch into fluffy goslings 30 to 32 days later, Dorothy practically lives in the hatchery. Eggs are hand-turned twice daily and she readily admits that

Reprinted by permission from California Farmer, 83 Stevenson St., San Francisco 5, California

goose eggs are hard to hatch due to the high moisture needed.

"I go by the feel of the egg," she says. She doesn't use a hydrometer but tells at a glance through long experience if an egg is getting enough moisture. Goslings are sold when a few days old, except for those saved for replacement stock. She doesn't like to mate the birds when too young, believing that this practice lowers the fertility rate of the eggs. Matings of 4-year-old birds produce a higher fertility percentage, she avers.

A man in Surrey, England, gets his garden dug by burying half-crowns and then inviting children to dig for "treasure."

Along this same line, she pens the geese off in small groups rather than letting them all run together in one big pen. Two-foot-high "snow fences" of laths are all that are needed for the pens under shady trees. A gander is mated to two geese among this breed, usually in separate pens during the mating season. As the geese get older, a gander will pick out one goose, however, and become monogamous.

Her geese are easy to grow and take care of once the hatching is over, says Dorothy. With the help of her parents, she also keeps rabbits, goats and a calf.

Geese get a high-protein turkey formula feed plus greens, some of which are brought in by friends now that the Locklin's ranch is over-shadowed by urbanism. Given a chance, the geese eat all the weeds in sight, which keeps Dorothy on the lookout to see that no harmful sprays have come in contact with the birds' feed supplement.

Meat, Not Fat, Is Consumer Demand

Sell hogs when they reach 200 pounds. The consumer wants meat, not fat. Carrying hogs to 300 pounds, or even 250 pounds, then selling them is just not good business because feed is wasted. It takes more feed per pound of gain after the 200 pound weight is reached than it did to put on that first 200 pounds. Too fat hams, too fat loins and too fat shoulders help push pork prices down. See the county agent for more information on growing meat type hogs to the proper finish. —*Agricultural Notes*

Irrigation Pays for Itself

Increase yields per acre and get better quality crops . . .

Condensed from The Tennessee Farmer

Tom Swetnam

AN IOWA farmer reports that his irrigated corn yield is five times that of the non-irrigated field belonging to his neighbor.

"Our $12,000 irrigation investment paid for itself in two years," says John Martin, Clarkson, New York.

A Tennessee test on white clover-orchard grass-bluegrass pasture showed 43 per cent more milk could be produced by irrigation.

Six acres of irrigated strawberry plants reportedly brought $4,000 to a Kentucky farmer.

Many similar reports are coming in from all parts of the country. Well-informed sources indicate that the number of irrigated farmland acres is definitely rising. A better idea of that growth may be had by looking at the amount of aluminum tubing production for irrigation purposes. In 1946, only about 200 miles of tubing was produced but by 1955 there were more than 13,050 miles manufactured.

Every state east of the Mississippi River has an average annual rainfall of between 40 and 50 inches—plenty of water to produce a top-yielding crop. Nevertheless, WHERE and WHEN the rain falls is just as important as HOW MUCH falls. As a rule, more rainfall is required in the latter part of the growing season rather than during the spring and early summer. In late summer the plants are maturing and need more water, also there is a greater percentage of evaporation from the soil in hot weather.

Drouth Years Have Shown Need

Another reason irrigation has found favor is because of the recent drouth years of 1951-54. Many farmers installed irrigation systems during those years and found their irrigated crops were even more productive, both in quality and quantity, than they had been in so-called "normal" years.

All of these things together have caused the eastern farmer to take up a practice which has long been followed by crop producers of the more arid west—that is irrigation.

Reprinted by permission from The Tennessee Farmer, 1529 Demonbreun, Nashville, Tennessee

Even though reports indicate that irrigated acreage is on the increase, it should be remembered that irrigation in itself has no cure-all powers.

If you feel that irrigation can increase the profits of your farm program, you must first determine if the crops you raise will respond profitably to irrigation. Next you must find out if there is a sufficient supply of water at hand and if you have the legal right to use that water.

If you decide that your crops would profit by irrigation and you have the water supply for it, your returns will still be small unless you (1) irrigate the more productive soils, (2) use recommended varieties of seed and plants, (3) follow recommended cultural practices, (4) follow recommended planting rate, (5) follow recommended fertilization practices, (6) follow recommended insect and disease control practices, (7) have adequate labor, and (8) utilize an efficient irrigation system which will meet the recommended requirements for design.

Your next problem is to choose a system which meets the need of your particular farm. Designing such a system is a good engineering problem which involves the soil, the crops, the sprinklers, good couplers and a juggling of pressure with pipe size and pumping unit. All irrigation equipment dealers have, or should have, specially trained men to cope with these problems.

In order to have a fully guaranteed system, it is important to buy all of your equipment from one dealer. Probably the best plan would be to consult several dealers in order to look over their equipment and to find the best price, then purchase your entire system from the same dealer. You should expect, and he should be willing to give you, a written statement on the system so there would be no misunderstanding as to what you are getting and what the system would do. The statement would include the acreage to be irrigated, the soil type, the crops on which you intend to use it, the depth to which you would irrigate, the inches of water per hour, the number of laterals, the number of acres covered per setting, the pumping time per setting, the number of settings it would take to cover the land to be irrigated and the time involved in one cycle, and the pressure required for operation.

You should also expect a complete listing of the equipment involved. When the system is delivered, you should expect the dealer to come out and see that it operates properly. Then, if the system does not perform as it should, you should expect him to see that it does. The dealer who will agree to all of these things

is the one from whom you should buy your system.

It's Worth Investigating

Reports like those mentioned at the beginning of this article make it evident that irrigation has helped some farmers. United States Department of Agriculture statistics show that the number of acres under irrigation is steadily on the increase and has been increasing for the past six years. Such information indicates that much of our land may be more profitably farmed with the aid of irrigation. Maybe your farm is one which would produce on a more profitable scale if you had an irrigation system—it's worth investigating.

You should be cautioned once again that irrigation is no magic remedy, but when the soil is capable of producing high yields, and water is available in the amounts needed, then irrigation is a way to more dollars for you and your family.

Bright Future for Farm Youth in Work Related to Agriculture

Jobs in fields related to agriculture are multiplying rapidly, and many young people from rural areas are taking these new positions, the U.S. Department of Agriculture reports.

A national average shows 168 young farm men available to replace every 100 farmers who die or reach retirement age. As a result, almost 40 per cent of the boys now growing up on farms and ranches are expected to seek work off the farm or ranch when they reach manhood.

Two professional jobs are waiting this year for almost every graduate in agriculture from our land-grant universities and colleges. The 8500 expected to graduate will be able to choose from about 15,000 job openings in teaching, research, extension, communications, conservation, farm services, and others.

Many jobs are available for those who did not attend college. They include work in industry, trucking, artificial breeding, repair and servicing of farm machinery, fruit spraying, airplane dusting, and many other fields.

Increase in off-farm agricultural employment opportunities has accompanied the national decrease in numbers of farms.

—University of Wyoming

Drying Corn On the Farm

This digest of two U.S.D.A. bulletins gives you facts and figures . . .

Agricultural Research Administration

DRYING grain by mechanical ventilation removes many of the hazards of harvesting and storing crops. Such drying is valuable to you not only when you are faced with the emergency handling of high-moisture crops, but also as a part of your regular crop-management program. Controlled drying fits in with modern production, harvesting, and handling methods. It overcomes the problems presented by the use of grain combines and mechanical corn harvesters—equipment that gets the crops out of the field quickly but often dangerously wet.

Grain drying on the farm has the following advantages:

A. Corn can be—

1. Stored safely.
2. Marketed without a moisture discount.
3. Harvested early, thus taking advantage of good harvesting weather, reducing field losses from insects and bad weather, obtaining cleaner husking, lowering harvesting costs, and making possible fall plowing and seeding of wheat or cover crops.
4. Shelled and stored in tight bins in half the space required by ear corn, thus reducing storage losses caused by insects, rodents, and unfavorable weather.
5. Harvested with a picker-sheller.
6. Saved in wet years.

If drying crops with mechanical ventilation is new to you, the advantages and disadvantages listed below for both unheated- and heated-air drying may help you in considering your drying set-up.

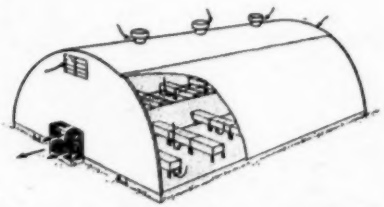


Figure 1.—General-purpose building arranged for drying and storing grain.

Heated-Air Drying

Advantages:

1. Can dry wettest grain.
2. Can dry regardless of weather conditions.

Reprinted from Leaflets 332 and 333, published by the U.S.D.A., Washington, D. C.

3. Short drying time.
4. High drying capacity per fan horsepower.

Disadvantages:

1. Higher initial equipment cost.
2. Expense for fuel.
3. Some fire hazard.
4. Considerable supervision required.

Unheated-Air Drying

Advantages:

1. No expense for fuel.
2. No fire hazard.
3. Lower initial equipment cost.
4. Little supervision required.

Disadvantages:

1. Dependent on weather conditions.

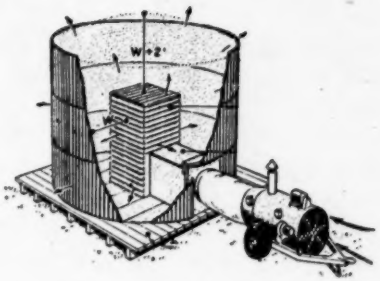


Figure 2.—Inexpensive, easily built crib with drier.

2. Slow drying rate; usually several weeks.
3. With prolonged drying, grain may be damaged by mold growth.

Drying Shelled Corn With Unheated Air

MECHANICAL ventilation with unheated air is, under many conditions, an inexpensive method of drying grain. By this method, you can dry shelled corn or small grain in farm-type bins or general-purpose structures by installing duct systems or perforated false floors to insure the distribution of air uniformly through the grain. A crop-drying fan will be needed to circulate the unheated air through the grain. This method offers a reasonable protection to the quality of the grain under normal weather conditions.

In general, the recommendations here apply to the Corn Belt and other areas with similar weather conditions and production practices. In drier areas, minimum air-flow requirements may be less; in wetter areas, air-flow requirements will be higher.

General Recommendations

1. When filling the bin, spread any cracked grain and foreign material uniformly through the batch.

2. Select ventilating equipment that will provide the required air flow at resistance pressures corresponding to the depth of grain through which the air will pass. The equipment should be capable of operating continuously at a constant rate for periods of 2

to 4 weeks without frequent maintenance.

3. Provide for the uniform distribution of the drying air through the grain. There should be no appreciable loss in pressure in the duct system or perforated floor. Air may be either drawn or forced through the grain.

4. Supply air at a rate that will complete drying before the grain is damaged by mold growth or other causes. (For minimum air-flow requirements, see table 1.)

If your foot slips, you may recover your balance, but if your tongue slips, you cannot recall your words.
—Martin Vanbee

5. Start drying immediately after harvest and continue it until the moisture content of the grain is reduced to a safe storage level. The drying period may extend for 2 to 4 weeks, or perhaps longer in cool or wet weather.

6. For safe storage, dry shelled corn and small grain to about 13 per cent moisture. If dried to only 14 to 15 per cent, grain can be stored safely for only a few months during the cooler part of the year.

7. When the moisture content of the grain is above 15 per cent, supply air continuously, day and night. To reduce the moisture further after it has reached approximately 15 per cent, limit ventilation to periods when the relative humidity of the air is less than 70 per cent. The relative humidity will normally be below 70 per cent between 10 a.m. and 6 p.m. on clear days.

Air Flow Requirements

With modern equipment, corn may be harvested and shelled at a moisture content as high as 30 per cent. However, some mechanical damage to kernels occurs when corn is shelled with conventional equipment. The damage may be excessive when the moisture is higher than 25 per cent. Damaged or broken kernels are more subject to mold than are sound kernels.

The recommended minimum air-flow rates for drying shelled corn from various moisture levels are given in table 1. Shelled corn has less resistance to air flow than either oats or wheat. In power requirements, the lower resistance partly offsets the higher rates of air flow required to dry corn at the higher moisture levels.

Ventilating Equipment

The ventilating equipment required for drying grain with unheated air consists of a fan and a power unit. The fan may be of either the propellor or the centrifugal type, and it must deliver the required volume of air against the static pressures indicated in table 1. Reliable manufacturers will supply air-delivery ratings for the range of static

pressures for which their fan equipment is designed. Fans that are unsatisfactory for grain drying include house, attic, or barn ventilating fans; those for blowing materials, such as silage and grain blowers; and those of the type used in fanning mills.

Electric motors are recommended for use in drying grains. Gasoline engines may be used, but more labor will be required to attend and maintain them than for electric motors.

The number of bushels that can be dried per horsepower is reduced materially as the depth of grain is increased. On the other hand, the cost of building a structure with a greater floor area, in order to reduce the depth of the grain, will more than offset the lower power requirement.

By using table 1 you will be able to figure the fan horsepower required to dry corn from different percentages of moisture content and at various practical depths.

Suppose that one has a circular bin 18 feet in diameter or a rectangular bin 14 by 18 feet and that the shelled corn to be dried has a moisture content of 25 per cent.

To compute the floor area of the circular bin, use the formula

TABLE 1.—*Fan requirements for shelled corn with unheated air from different percentages of moisture content and at various practical depths.*

Grain moisture content (per cent)	Recommended minimum air-flow rate per bushel	Practical grain depths	Static pressure[1]	Maximum quantity that can be dried per fan horsepower
	Cubic feet per minute	*Feet*	*Inches, water gauge*	*Bushels*
25	5	4	0.7	860
		6	1.6	380
20	3	6	.9	1,120
		8	1.5	670
18	2	6	.6	2,500
		8	.9	1,670
		12	2.2	680
16	1	8	.5	6,000
		12	1.0	3,000
		16	1.6	1,880

3.14 times diameter squared divided by 4. Thus 3.14 times 18 squared divided by 4 equals 254.3 square feet. To compute the floor area of the rectangular bin, multiply the dimensions—14 by 18 feet—which gives 252 square ft.

Table 1 shows that the greatest practical depth for drying shelled corn of 25 per cent moisture content is 6 feet.

The volume of shelled corn in a bin 18 feet in diameter, when filled to a depth of 6 feet is 1,526 cubic feet, obtained by multiplying 254.3 square feet (floor area) by 6 feet (depth of grain).

In Argentina, Mufti Maluf, a Turk living in the small town of Bella Vista, decided that his house would be larger and more comfortable if it covered all the sidewalk.

When he started laying the foundations on the sidewalk, the local police tried to dissuade him but to no avail. Eventually, it took the Provincial Minister of Finance and several other high officials to convince him that the sidewalk was state property.

—New York Times

The capacity in bushels, approximately 1,220, is obtained by dividing 1,526 cubic feet (volume of the bin) by 1.25 cubic feet (the volume of a bushel).

Table 1 shows that 380 is the ture, and 6 feet deep, that should be dried per fan horsepower. Divide 1,220 (the capacity of bin in bushels) by 380 (number of bushels to dry per horsepower). The answer, 3.2, is the number of horsepower required to dry the batch of 1,220 bushels.

Use a 3-hp. motor and a suitable fan. The 3.2 hp. required to dry the corn is within the 10 per cent overload permissible with a 3 hp. motor.

When buying the 3 hp. fan unit, remember that it must deliver 5 cubic feet per minute (cfm) of air (table 1) for each bushel, or about 6,000 cfm total; also, that the unit must be able to deliver the air against about 1.6 inches static pressure (table 1).

This same fan equipment will dry other crops at depths at which the bushels per fan horsepower total 380 or more.

Adapting Storage Bins

Most farm bins can be readily adapted for drying grain with unheated air by installing a false floor or duct system. Fan units may be installed either to draw the unheated air through the grain or to force the air through.

Estimating Costs of Drying

Drying costs will include both the operating cost for power and maximum number of bushels of shelled corn of 25 per cent mois-

labor and the overhead cost of equipment. The power cost will depend on the initial moisture content of the grain, weather conditions during the drying period, and the depth of grain ventilated. At 3 cents per kilowatt hour, the power cost in well-designed drying systems is usually between 1 and 4 cents per bushel.

Drying Ear Corn With Heated Air

EAR CORN can be dried for storage or market by mechanical ventilation with heated air in any kind of weather and from any moisture content. Fuel costs will be about in proportion to the amount of water to be removed from the corn and the weather.

General Recommendations

1. Harvest your corn as cleanly as possible.

2. Arrange air ducts, or tunnels, to distribute air uniformly. The air should travel about the same distance through the corn in all parts of the crib.

3. In warm weather operate the drier day and night. In cool weather either continuously or in the daytime only. The total fuel required will be about the same. If you operate the drier in daytime only, cool the corn by letting the fan continue to run for an hour or so after the heat is shut off each evening.

4. As a general rule, drying-air temperatures should not be more than 130° to 140° F. In cold weather the drying air should be at least 60° warmer than the outdoor temperature. For seed corn, the drying-air temperature should not exceed 110°.

6. Use good equipment with adequate safety controls and operate carefully. Check with your fire insurance agent to be sure that you have adequate coverage when using heated-air drying equipment.

Equipment Requirements

Equipment needed includes a heater such as an oil burner, a power-driven fan, and a crib or drying bin for the corn.

Several makes of crop driers are now on the market. Most driers are portable. Each unit consists of a power-driven fan, a heater, and suitable safety controls. The heater may burn oil, natural or liquefied petroleum (L. P.) gas, or coal. Such driers have two characteristics that determine their performance in drying grain: (1) The rate at which heat is supplied (rate of fuel consumption per hour) and (2) the rate of air supply in cubic feet per minute (c.f.m.)

Driers are classed as "direct heat" and "indirect heat." At least two automatic safety controls are needed with either kind

of drier. These controls are: (1) A device to shut off the drier if the flame fails, and (2) one to shut off the fuel supply if the temperature goes too high.

In the portable direct-heat crop drier, burnt gases are combined with heated air and the mixture is blown through the grain. This type of drier uses fuel efficiently, but there is some fire hazard.

In the portable indirect-heat crop drier, the burnt gases are discharged through a smokestack. The fire hazard is less than with a direct-heat drier.

When selecting a fan, the most important factors to consider are suitable design, size, and speed. Of secondary importance is whether the fan is a propeller or centrifugal type.

Cost of Drying

The quantity of fuel oil needed to dry a batch of corn, and the operating time, can be estimated from available tables. If the corn is not dried to an average moisture content as low as 13 per cent, less fuel oil will be required to dry 1,000 bushels.

Other costs of drying besides that for fuel oil and labor of attendance will be for materials and labor for attaching the air duct and covering crib walls, for power to drive the fan, for insurance, repairs, and overhead cost of equipment—interest on investment, depreciation, and taxes. When drying corn from 25 per cent moisture, the cost of fuel oil and power in the fall of 1952 may not exceed 5 cents per bushel, but when all other costs are included the total may be 10 cents or more per bushel. This cost will be less per bushel if the drier is used to dry large quantities of corn, as on a large farm or for several neighboring farms.

(This article is condensed from U.S.D.A. Leaflets 332 and 333. Copies of these bulletins are available at 10c each from Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C.

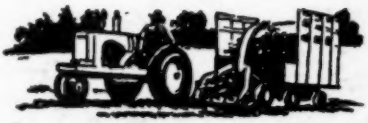
Puzzle

A Kentucky legislator has introduced a bill to require all Wisconsin milk coming into that state to be colored purple. A New Yorker has proposed that Wisconsin cheese be dyed brown and labeled "spoiled." A Missourian advocates that Wisconsin beer be served only in vessels resembling chamber pots. And a Wisconsin assemblyman has introduced a bill to dye oleomargarine pink.

Only one of these preposterous things has really happened, of course. Guess which. You're right. The last.

—The Milwaukee Journal

How To Increase Profits from Forage



Making oat silage, seeding in wide row corn, using other alternatives may boost your dairy income . . .

Condensed from
Michigan Farm Economics

C. R. Hoglund and *M. B. Tesar*

DAIRY FARMERS have been encouraged to make greater use of forage crops as a means of lowering feed costs and thus increasing net income. Yet farmers have made little progress in this direction. Hay and pasture acreage has stayed about the same for the last 15 years. The total tonnage of hay harvested annually has shown little change, but a higher proportion is now alfalfa.

Better harvesting, storage equipment and methods have resulted in some improvement in forage quality in recent years. But many dairy farmers continue to feed both protein and grain heavily because forage quality is poor or inadequate quantities are produced.

In this article, we will explore ways of increasing returns from forage: using alternative seeding and harvesting methods, and renting more land.

Factors Affecting Forage Returns

There is no magic formula for increasing the returns from forage crops. The first step is to produce high-yielding, high-quality forages. Harvesting and storage methods used by farmers determine the quantity and quality of the feed nutrients preserved for feeding. Finally, the economy of utilizing these forage crops is determined by the combinations and levels of roughage and grain fed, by the feeding methods used, and by the inherent capability of individual cows to convert feed into milk. All of these factors influence the profitability of producing forage crops.

Some dairymen have not made greater use of forage crops because yields have been low compared to other crops. On the more productive soils in Michigan, corn yields of 90 to 100 bushels per acre are not uncommon, yet very few farmers produce hay yields of 4 to 5 tons per acre. Recommended quantities of fertilizer and lime, and improved practices have not been applied to forage crops to the same extent as to corn and other grain

Reprinted from Michigan Farm Economics, Michigan State University, East Lansing, Michigan

crops. Therefore, a rather high proportion of forage stands are low in legumes and are unproductive.

The production of low-yielding companion crops in establishing seedings has tended to discourage the greater use of forage crops. Experimental work and the experience of farmers point out two ways to increase the production from companion crops and the resulting forage stands. The first is to change the method of harvest; the second is the use of a different companion crop.

Two farms were selected to test the economic consequences of using alternative seeding and harvesting methods. The first farm has 180 acres of moderately productive soil. The second farm has 140 acres of highly productive soil.

A rotation of corn, oats and 3 years of alfalfa-brome grass is commonly used on dairy farms with moderately productive soils. Rotations on the highly productive soils usually have 1 less year of legumes. Better-than-average managerial skill and a high level of adoption of improved forage practices are assumed. We further assume that cow numbers will be adjusted to changes in the feed supply resulting from the different alternatives.

Changing the Method of Harvest

Oats harvested for grain yield only 40 to 50 per cent as many pounds of total digestible nutrients (T.D.N.) as corn fed as corn-and-cob meal. The T.D.N. yield from oats is doubled when harvested for silage instead of grain, thereby making it more nearly competitive with corn. Another advantage of oat silage is that grain harvesting equipment can be eliminated when no other grain crops are produced.

Timeliness in harvesting is extremely important in the production of palatable, high-protein oat silage. The optimum period in which oats may be harvested for silage is relatively short compared with legumes. It is estimated that the earlier harvesting of oats for silage will add 5 per cent to alfalfa-brome grass yields because of improved stands.

On the other hand, a shift to the use of oats for silage rather than for grain results in a bedding supply problem. Shredded cornstalks, cobs and wood shavings are often used as substitutes for straw. For this analysis, it is estimated that cash expenses for bedding will be increased about $12 per cow when oat straw is not available.

A change from seeding in oats for grain to oats for silage is expected to increase feed production enough to add four additional cows on both the farms with moderately productive and highly productive soils. The net effect of shifting to the harvesting of

oats for silage rather than grain is estimated to add about $1,800 to gross income, $900 to expenses and $900 to net income. This is based on milk sales of 9,700 pounds per cow, a price of $4.00 per cwt., and 1956 costs. This estimated increase in net income will be much less if average production practices are used or if cow numbers are kept constant.

> I am not bound to win, but I am bound to be true. I am not bound to succeed, but I am bound to live up to what light I have. I must stand with anybody that stands right, stand with him while he is right and part with him when he goes wrong.
>
> —Abraham Lincoln

Seeding alfalfa-brome grass in oats in August and then grazing or harvesting the forage in October is another alternative. This method of seeding is also expected to increase feed supplies enough to carry three or four more cows but it may be somewhat less profitable (particularly on the farm with highly productive soils) than the oats silage alternative. However, it is an excellent way to obtain productive seedings, particularly on farms where weeds are a serious problem and must be removed before legumes and grasses are seeded.

Using Different Companion Crop

Another alternative is to seed sudan grass, harvested for silage, green-chopped material, or pastured. Sudan grass harvested for silage yields about double the T.D.N. on the moderately productive soils. On the highly productive soils, the T.D.N. is two and a half times more than that of an acre of oats harvested for grain. It is more difficult to establish seedings in sudan grass than in oats, especially on the lighter, less productive soils. The success of a seeding made in sudan grass depends on removing the forage for grass silage in early July before it takes too much light and moisture from the new seedings.

Seeding in sudan grass harvested for silage seems to be a less profitable alternative than oats harvested as silage on the less productive soils. However, for a dairy farmer following a green-chopping system, the sudan grass may be a better crop because of its midseason production response.

If alfalfa-brome grass yields are reduced 10 per cent because of poorer stands in sudan grass seedings, this alternative is expected to reduce net income. Such yield reduction is entirely possible on the lighter soils; in such a case, the total feed supply would not be increased.

When seedings established in

sudan grass on the more productive soils yield at least 95 per cent as much as those established in oats harvested as grain, this becomes a profitable alternative. Poor timing in harvesting sudan grass could easily reduce alfalfa-brome grass stands and yields by 10 per cent or more. Under these conditions, sudan grass would be a poor alternative, even on the more productive soils.

At silo filling time farmers should watch out for a poisonous gas—nitrogen dioxide—that may form in fresh silage, the U. S. Department of Agriculture advises.

Seeding in wide-row corn is a fairly new practice. Experimental results have shown that forage yields of seedings established in wide-row (60 inches) corn are only about 5 per cent lower than those established in oats when recommended practices are used. This appears to be the most profitable alternative on the highly productive soils when forage yields are at least 90 per cent as good as those established in oats for grain. Even if forage yields should drop down to 85 per cent, this alternative appears to be as profitable as harvesting the oats as silage. The yield of corn is reduced by 5 to 10 per cent when corn is grown in 60-inch rather than 40-inch rows. Seeding in corn is not recommended for the lighter soils.

Renting Additional Crop Land

What are the opportunities of increasing net income by adding more land without changing forage practices? If 20 acres of cropland could be rented and four milk cows added to utilize the extra feed produced on the farm with moderately productive soil, net income could be increased by about $750 or about $150 less than the oat silage alternative. Renting 16 acres of cropland to provide feed for four more cows would add slightly more than $600 to net income on the farm with highly productive soil.

Many dairy farmers find it difficult to rent additional cropland; thus, they must depend on other methods of increasing feed supplies. An additional alternative not studied would be to produce a maximum of forage crops and purchase part or all of the grain needed.

Dairy farmers will need to select the seeding and harvesting methods best suited to their farm resources. The entire forage program for a farm must be considered when alternative methods are studied. It is believed that many dairy farmers can increase net income by making greater use of improved forage practices that fit their individual farm situations.

Cross-Breeding of Livestock in the United States

Are purebreds doomed? Read this article from a leading English farm magazine . . .

Condensed from The Agricultural Review

H. G. Hutchison,
Veterinary Research Laboratory, Tanganyika

ALMOST ever since the establishment of distinct breeds of farm animals, the crossing of these breeds has been resorted to by commercial producers of livestock.

In the case of dairy cattle, indeed, the practice has been condemned. Elsewhere the process has generally stopped at the first cross. There are exceptions—for example, it is a fairly old practice, in Scotland and northern England, to mate a first-cross ewe with a ram of a third breed. Still more complicated crossing has been commonly branded as 'mongrelizing'.

The early geneticists, impressed by the phenomenon of Mendelian segregation (and the consequent wide variation among the progeny) under any system of continuous crossing commonly agreed with these views. A later generation has admitted that, in the case of the quick-breeding species—poultry, pigs and perhaps sheep—crossing may be carried further and that, even in beef production, it may proceed to the second stage. Dairy-cattle improvement must proceed by selection within the single breed.

Breed societies have in general frowned upon cross-breeding, except only in those cases—e.g. that of the Border Leicester—where the breed had been designed for the specific purpose of crossing with some other. Again, official measures have generally been designed to promote improvement within the breed by 'grading up' through the use of successive good sires of the same breed.

It may be true that pure breeding is the best system under the environmental conditions under which the particular breed has been developed, but it is not necessarily the best where it is desired to achieve improvement under other and different condi-

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tions.

Most of the breeds that have been imported into the United States have been sufficiently variable to permit progress, by selection, towards the production of strains well adapted to specific North American environments. But this has not always happened, and the need has been recognized to combine characters from two or more existing breeds to meet new conditions. Exploratory cross-breeding has led, in several cases, to the evolution of new breeds.

Apart from the success of such 'evolutionary' cross-breeding, designed to provide new combinations of genes, there has been, in America, the outstanding commercial success of hybrid maize (corn). The achievements of the maize breeder have aroused interest, both in the United States and elsewhere, in the possibilities of commercial exploitation of heterosis in farm livestock.

Today, the visitor to American centers of animal-breeding research gets the impression that the scientists, endeavoring to persuade farmers to exploit the possibilities of cross-breeding, are opposed by the great majority of breed societies, which seem to be concerned mainly with the preservation of their vested interests.

There are indeed some notable exceptions—those breed societies which are concerned with the value of their particular breeds for crossing with other breeds. One pioneer breeder has given it as his opinion that 'By 1977, and perhaps sooner, the livestock industry will cease to think in terms of individual breeds, but in terms of individual sires and dams, regardless of breed'.

'Evolutionary' Cross-Breeding

During the last thirty years American breeders have evolved a considerable number of new breeds, including sheep and horses as well as pigs and cattle. Perhaps the most striking facts that emerge from a study of the methods and results are:

1. The early expectation, that the second hybrid generation from a cross would show excessive variation in respect of commercially-useful characteristics, has not been fulfilled. Most commercially-important qualities are the expression of a multitude of separately-inherited factors (alleles). To take an extreme example, if we cross a dairy with a beef breed, we do not get a ratio, in the second hybrid generation, of one beef, two dual-purpose and one dairy type; only a relatively few generations of selection are necessary to 'fix' the new combination of commercial characteristics in a 'synthetic' breed.

2. The other early expectation, that a vast number of crossbred animals would be required to pro-

vide the nucleus of a new breed, has not been fulfilled. In many cases quite small numbers have proved sufficient to provide a sound foundation.

Thus the Columbia sheep project began in 1912 with initial test matings of a single ram from each of four breeds—Lincoln, Cotswold, Leicester and Romney Marsh—each mated to a pen of forty Rambouillet ewes. The Lincoln crosses were outstanding. The said Lincoln ram was then used in a flock of 66 Rambouillet ewes, producing 40 ewe lambs. Within a few years the crossbred flock of 200 head was built up. By 1918 the worker in charge was convinced that he had 'pretty well fixed a type with a good combination of characteristics'. Similarly, the Targee breed, (developed from the Rambouillet, Corridale and Lincoln) was considered to have attained reasonable stability of type after three generations of selective breeding from the original crosses.

A dairy cow will drink as much as 35 gallons of water a day.

The Minnesota No. 1 pig, developed from a cross between the Tamworth and the Danish Landrace, was recognized as a breed only ten years after the initial crosses had been made. The Minnesota No. 2, developed from crosses between inbred lines of the American Poland China and the Canadian Yorkshire (Large White), was recognized as a breed only seven years from the time that the initial crosses were made.

One broad conclusion from the American work is that the broader the initial foundation, the greater is the scope for selection among the crossbreds to produce a new type, with the desired combination of qualities, that will breed reasonably true to type. The number of pigs required to give sufficient scope for selection would seem to be about four hundred in each generation.

With cattle, naturally, the process of breed formation by evolutionary cross-breeding takes longer, but the numbers required seem to be of the same order as those required in the case of the pig.

The creation of the Santa Gertrudis breed of cattle—designed to combine beef qualities with adaptation to hot climates—was achieved through the use of relatively large numbers, with the facilities available on a million-acre ranch. In fact, a total of fifty-two bulls were used in the eight units; from the progeny of these, a foundation stock was built up by selecting some 700 heifers annually, and the project was stabilized at a size of some 6,000 head. The breed was recognized in 1940, twenty-two years

after the initial crosses had been made. The present type is probably less variable than that of many long-established breeds.

A parallel project, designed to combine beef qualities with capacity to withstand the heat and drought of the Texas ranges, has resulted in the evolution of the 'Beefmaster'. The foundation stock comprised about 350 Brahman (Zebu) cows, 150 Hereford cows with relatively small numbers of Brahman and Hereford and two Beef Shorthorn bulls.

The method employed in this case by Mr. Tom Lasater, the originator of the breed, differed from that pursued on the King Ranch. He has mainly applied mass selection — severe culling rather than selection of outstandingly good individuals. It may be that he would have made more rapid progress through a more elaborate system of individual selection of females with the 'proving' of bulls, but his breed seems to compare favorably with the Santa Gertrudis under closely comparable conditions. Fertility is very high, and calves, reared on the range, ordinarily reach 600 lb. liveweight at weaning. Mr. Lasater has concentrated on purely utility characteristics, neglecting color, horns, etc.

The recent succession of severe droughts in the Southern Range area of the United States has shown that the new breeds have, in fact, much greater ability to live, under difficult conditions, than the cattle of pure European breeding.

Other new breeds include the Charbray (developed from the French Charolais and the Zebu) and the Brangus — developed from the Brahman and the Aberdeen Angus.

These new breeds, through not closely conforming to the accepted beef type, show up very well 'on the hook'. They generally dress out fully 2 per cent better than European pure-breds and, under range conditions, show up very well in respect to weight for age.

It would seem that an adequate degree of heat tolerance can be obtained with no more than about 25 per cent of Zebu blood. Moreover, it appears that there is wide variation among individuals of the same European breeds, with respect to heat tolerance. The production of high-yielding, heat-tolerant dairy cattle would be a notable step of progress towards providing adequate amounts of milk to the inhabitants of tropical lands. Meantime, work in the United States is hampered by the very small numbers of Red Sindi cattle, which have been imported from Asia with the intention of combining their heat-tolerance with the

greater productivity of American dairy breeds.

'Commercial' Cross-Breeding

The advantages of cross-breeding are fairly widely recognized by commercial producers of poultry, pigs and sheep and, to a less extent, by those of beef cattle.

Experiments in 'rotational' cross-breeding have been in progress with dairy cattle at Beltsville and with range beef cattle in Montana. Both experiments have demonstrated the merits of this type of cross-breeding for commercial production. Inadequate evidence of the productivity of the pure-bred progeny of the bulls in the Beltsville experiment makes the results less convincing than they would otherwise have been; but some records of the pure-bred progeny are available and these suggest that the successive use of progeny-tested or sib-tested bulls of different dairy breed is a better commercial proposition, under Maryland conditions, than pure breeding from animals of equivalent merit.

Egg prices will be stronger for the year ahead — chicks for laying flock replacements are being cut sharply. Feed will continue plentiful.

In poultry and pig breeding, the trend in the United States is the production of highly inbred types as a foundation for one or other system of cross-breeding. Already there is large-scale production of tested and proved inbred lines of several breeds of poultry and pigs, specifically designed to produce crossbred or line-cross sires for the use of commercial producers. Progress is almost as spectacular as that achieved with hybrid maize.

An example of the application of the new material, in rotational cross-breeding for commercial production, may be quoted. The process in pigs is as follows:—

(1) The available females are mated to a boar of the Minnesota No. 1 breed.

(2) The crossbreds are mated to a Minnesota No. 2 boar.

(3) The second crosses are mated to a Minnesota No. 3 or C-line boar.

(4) The third crosses are mated back to Minnesota No. 1 boars.

Financial considerations and the low fecundity of cattle prevent the application of such 'in-crossing', whether for beef or milk. But with respect to pigs and poultry, the system is making headway and it is confidently predicted that pure-bred herds of pure-bred flocks of poultry will decline markedly in the coming decade. Indeed, some suggest that the purebreds may ultimately become little more than reservoirs of the essential material for the commercial cross-breeder.

How to Estimate Your Stand of Corn

Arthur M. Brunson, Agronomist,
Purdue University

A COUNT of "plant population" may help you decide if it is necessary to replant corn, or determine the need for more fertilizer or irrigation applications. Soil scientists also make good use of this information in recommending fertilizer and planting rates.

You can easily estimate the number of plants in a field of drilled corn from the number of stalks in a measured unit of row length. The unit of row length will depend on the row width. The average number of plants per unit of row length times 1,000 will give the number of plants per acre.

Listed below are the units of row length in which plants are to be counted for seven common row widths.

Row Width	Row Length
36	14 ft. 6 in.
37	14 ft. 2 in.
38	13 ft. 9 in.
39	13 ft. 5 in.
40	13 ft. 1 in.
41	12 ft. 9 in.
42	12 ft. 5 in.

Select a suitable length of row as shown above. Count the number of plants from 10 such units. Take the average count for the 10 units and multiply it by 1,000. The product will be a close estimate of the total corn plants per acre.

The row width varies somewhat in a planted field with both the planter width and the planter marker. The width of 12 spaces (between 13 rows) measured in feet will give the average row in inches. An accurate average row in fractions of inches

can then be estimated from the length of row in the above table.

For unusual row widths, the length of row unit can be easily calculated as follows:

1 acre = 43,560 square feet = 6,272,640 square inches.

$$\text{Inches in row per acre} = \frac{6{,}272{,}640}{\text{row width in inches}}$$

For example, with a 60-inch width, the calculation would be:

$$\text{Inches in row per acre} = \frac{6{,}272{,}640}{60}$$

= 104,544 inches.

Row per 0.001 acre = 104,544 inches = 8 feet 9 inches.

The number of plants in 8 ft. 9 in. of a 60-inch row times 1,000 would give the plants per acre.

Grading Feedlot Beef

Many feedlot cattle are now being sold on a grade-and-yield basis. Feeders will be interested in some of the factors which affect carcass grade and dressing percentage. A review of experimental work points to the following conclusions, says Al Lane, Arizona livestock specialist.

First, desirable carcass grade is an inherited characteristic and can be passed from a good bull to his calves. Based on conformation when starting on feed, rangy calves are equal to, or better than, low-set calves, of the same quality, in gaining ability, dressing percentage and carcass grade.

Early or late castration has little effect on the carcass. However, steers "finish out" better than bulls, even though bulls yield edible meat of comparable quality to steers.

On full feed heifers show suitable market finish 30 to 40 days sooner than steers. With similar methods of feeding, heifer carcasses grade as well as steer carcasses.

Pregnancy in well-finished heifers, up to the fifth month, does not seriously affect dressing percentage. Carcasses of bred heifers are better finished, but there is no significant difference in grade.

A calf fed on a high plane of nutrition during his first winter will yield a higher grading carcass than one on low nutrition followed by pasturing, then finishing in a dry lot. However, exercise, itself, in no way affects carcass grade. —*Arizona Farm News*

Wanted . . An Up-To-Date Farm Philosophy

If we are to save the best and noblest from the rural scene of the past, it must be fitted into this new environment . . .

Condensed from
The Nation's Agriculture

Paul C. Johnson,
Editor of Prairie Farmer

IN OUR DAY change is as inevitable as death and taxes. Change is often uncomfortable. It threatens our cherished traditions. It requires painful adjustment.

Usually change creeps up on us. When we discover there is nothing we can do about, we proceed to set up a philosophy to fit the situation. The philosophy may not change the fact, but having put a philosophy in words, we are more likely to look forward than backward.

Therefore, we'd better have a look at some of the hard facts of farming and rural life which must be recognized in any philosophical system which we may formulate. Most conspicuous among these is the scientific and mechanical revolution in farming.

The American farmer himself has been the foremost evangelist for this change. As a result, productivity has increased at a sensational rate and machines have replaced many men on the food front. And so we find ourselves in America with 168 million population and less than five million farm units. Of this total only about 100,000 or two per cent, are very large units that might be called corporation farms or their equivalent. The solid core of farm production is supplied by only about two million fairly adequate commercial family farms which, together with the few corporation farms, contribute 86 per cent of our market volume.

The remaining farm units, somewhere between two-and-a-half and three million, are either in the hands of rural residents who get most of their income from non-farm work, or they are inadequate family farms contributing very little and unfitted to meet the competition of modern farming.

Some of the operators of these units will find the credit, the ex-

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tra land, and the managerial ability to become successful family farmers. Most of them will not. A way could be found to make them rural pensioners, but it is doubtful if a way can be found to make successful farmers of most of them for the simple reason that they are no longer needed. Farming has passed them by.

There are those who will challenge the statement that these disadvantaged farmers are no longer needed for agricultural production. They will trot out our old friend Malthus and point with alarm to the rapidly growing population. They will cite the ratio of population and acres and declare that hunger faces us once more at the turn of the century or maybe sooner.

If that fails they will cite the fact that half the population of the earth goes to bed at night hungry. I have seen some of these hungry people, but I have also come to realize they are members of agricultural nations. Can you sell large quantities of food to agricultural nations? No, because they have nothing to buy it with. Can you give large quantities of food to agricultural nations? Again the answer is no, because it would seriously disrupt the only thing they have which passes for an economy.

Some day I hope, and I believe, these nations will be properly fed, but they won't be fed with our acres; they will be fed with their own. Development of their own agriculture is the essential first step in their rehabilitation.

I think it is more sensible to assume that the improvement in agriculture has only just begun and the percentage of our population needed in food production will drop well below 10 per cent, perhaps to 5 per cent.

It is estimated that we can increase our farm output 40 per cent by 1975, using only the knowledge we now have. Do we think for a minute that scientific advance will stop tomorrow? It is more likely that agriculture may soon face the greatest jolt of all, discovery in the laboratory of the secret photosynthesis. This is the process by which the plant makes food from water and air.

Perhaps we should call a halt to research in the laboratory and improvement on the farm? But it isn't easy to put hobbles on progress.

We take pride today in offering an education to every boy and girl, and with that offer goes a relatively free choice of vocation or profession. This does not fit into a plan of restriction and regimentation, of curbing talents and ambitions.

Finally, we must face the fact that the distinctions between urban and rural living are being

rapidly erased. The farm family wants all the conveniences and luxuries enjoyed by the city family. The city family wants the advantages of country life.

This is what we see as we look around us. If we are to save the best and the noblest from the rural scene of the past, it must be fitted into this environment.

Nevertheless, at the risk of perpetuating our pleasant illusions, I offer the opinion that rural life

Hogs grown on more than three million farms in the United States provide an outlet for 40 per cent or more of our corn crop and produce about the same proportion of our red meat.

can be different from city life, and that it has, or can develop, attributes which will entitle it to be called a culture or a way of life. I believe we have a responsibility to seek out these characteristics and define these opportunities.

Recently in a meeting of rural pastors which I attended it was agreed that we should seek the will of God for agriculture and rural America. I gladly accept this goal. We need now as never before to search the Scriptures and all other sources of wisdom and guidance. But let us not look for the will of God nor the wisdom of the ages in the mirror of our own confusions and prejudices.

What is the will of God with respect to the agricultural revolution which we find ourselves in the midst of?

Do the changes which are occuring in rural America give men more or less freedom? Substitution of machinery for human labor requires capital which we associate with capitalism, or free enterprise, as we now call it. This is pertinent to our problem because more machinery means more production with fewer men, and we are much concerned about the million and a half farmers who are now being displaced.

Is it good or bad that honest tillers of the soil be required to shift to other work? Are we, after all, justified in freezing the old pattern of agriculture to avoid the pain of adjustment?

*I am often irked by the tend*ency in our day to make capitalism into a religion. I prefer rather to look upon it as an imperfect economic system which has, nevertheless, served us well and which provides the best economic climate for the exercise of human freedom. Let's admit that capitalism has an inherent ruthlessness which must be tamed and tempered by social responsibility and Christian conscience.

Nevertheless, it does seek to put human talents to full use. It

concerns itself with multiplication, not with division, as do the socialistic ideologies. It raises the challenge of man against resources, not man against man. It is based on the notion that man acquires material wealth by developing the resources of the earth, not by stealing from other men. Through the development of resources there is wealth for all, not just for a few.

Do we dare apply these principles to agriculture? Are we willing to say it is a good thing if our food needs can be met by five per cent of the population while 95 per cent turn to the production and development of other desirable goods and services?

Under economic stress we have recently taken steps to freeze the practices of agriculture and rural life into present patterns in order to avoid the painful adjustment which faces us. Whether we do this by subsidy or legislative control, we are arbitrarily limiting the exercise of human talent and the economic use of land and capital.

The ambitious laborer, limited to eight hours of work in the factory, may wish to operate a farm on the side. The ambitious farmer, limited by legislation in the land and opportunity, will build another business or seek another job on the side.

I believe any up-to-date philosophy of rural life must not only recognize the facts of the agricultural revolution, but should leave the door of opportunity open wide.

When farm people who take the trouble to think about such things and professional people involved in farming promote the case for agriculture we invariably use two principal arguments: (1) that agriculture is the keystone of our economic system and can be neglected only with grave consequences to all; (2) that the farm family is the keystone of moral structure of our nation. Both assumptions have been weakened by two facts of the agricultural revolution: (1) that agriculture is a smaller part of our total economy; (2) farm people are getting to be more like city people.

What then should be our goal? Certainly rural life still has many of the attributes we have cherished through the generations. Certainly the millions of city families who have migrated to the country in search of something they crave have not been entirely fooled by a mirage. I believe we can find our greatest challenge in restoring balance to American civilization. Man cannot live by bread and gadgets alone.

*Industrial and agricultural rev*olutions do not make men poorer in worldly goods. The poverty which we must fear is poverty of

the spirit. The Achilles heel of free enterprise is materialism. Souped up production and frenzied salesmanship to move that which is produced are not necessarily conducive of a serene and happy life. Planned obsolescence to keep factories busy is far from the highest of human goals.

There is cold comfort for mother in the gleaming appliances which line the walls of her modern farm kitchen if children find no joy in the home and father is growing ulcers running more tractors over more acres.

So that is our task, not to abolish free enterprise or curb human ambition, but to guide it into stiller and deeper waters. The emerging rural community, a cross section of farmers, artisans, merchants and professional people, can build a new philosophy in a modern setting to accomplish this purpose.

Rural communities have a special responsibility in education.

The FFA boy who learns how to grow a crop or fertilize a piece of ground, but who fails to learn how to read, write, speak and assume responsibility is badly educated for our times. What he learns about farming may be completely out of date in a few years. Education is due for a big shakeup in the near future.

There are heartening signs of the revival of religious life and practice in our day. The greatest antidote for materialism is reverence for God and the spiritual development which should go with it. Cultural development, or the manufacture of human sentiment, as it has been called, is close kin to religious development.

Unfortunately, many people resort to religious faith only as a last refuge in time of trouble.

Rural people have no monopoly in spiritual matters but we have every right to believe that the open countryside is a better environment for full development of the human being than the jungles of stone and steel we call our cities.

Elbow room, fresh air and the opportunity to contemplate the works of nature are a real human need. The crowded city tends to disfranchise the citizen and rob him of his democratic functions. It disrupts the family and makes strangers out of neighbors.

I find much encouragement in the suburban living which has mushroomed in our generation. We see neighborliness reborn. We see families drawn together by the small piece of land and home which is their own. If we can give more "living room" to this idea and marry it to the old rural agricultural tradition, we may build a rural culture that will sustain and enrich our country.

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Beef Production. Diggins and Bundy. 343 p. 1956. (Source 8) $5.85

DAIRY CATTLE AND DAIRYING

Dairy Cattle. Yapp & Nevens. 4th Ed. 1955. 420 pgs. (Source 6) $4.76
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Swine Production. Bundy and Diggins. 349 p. 1956. (Source 8) $6.00

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Forages: The Science of Grassland Agriculture. Hughes. 724 p. (Source 3) ..$5.95
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Managing the Farm Business. Beneke. 1955. 464 pages. (Source 6) $3.96
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Midwest Farm Handbook. 400 pages. 1954. (Source 3) $3.00
Agriculture Unadorned. L. S. Wolfe. Background, evolution of farming. (Source 4) Cloth .....$2.50. Paper $1.50

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Feedstuffs Handbook. Seiden and Pfander. 1957. 600 pages. (Source 5) $8.00
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Feeding Poultry. Heuser. 2nd Edition. 1955. 632 pages. (Source 6) $7.50
Commercial Poultry Production. Marble and Jeffrey. (Source 7) $6.00

VEGETABLES, HORTICULTURE

Vegetable Production and Marketing. Work & Carew. 2nd Edition. 1955. 537 pages. (Source 6) $4.72
Practical Horticulture. Shoemaker & Teskey. 1955. 374 pages. (Source 6) $4.20

FARM SANITATION

Rural Water Supply and Sanitation. Wright. 2nd Edition. 1956. Approximately 358 pages. (Source 6). Probably $4.90

FARM MARKETING

The Grain Trade: How It Works. James S. Shonberg, Uhlmann Grain Co. A comprehensive treatment by a man who should know the grain market. (Source 1) $6.00
Profitable Roadside Marketing. Donaldson, Johnstone. 1956. (Source 2) $2.00

VETERINARY

Livestock Health Encyclopedia. Seiden. 624 pages. 300 Illus. 1951. (Source 5) $7.50

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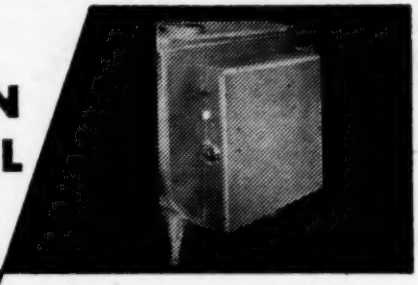

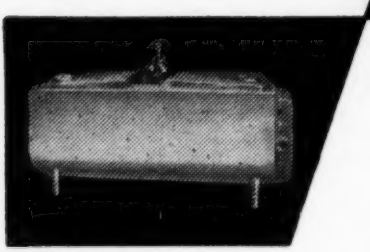

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